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ABSTRACT

Reported in this bulletin are major results from an ongoing study conducted by the World Fertility Survey (WFS) to examine fertility levels and trends and contraceptive use in developing and developed countries. Major results were available by early 1982 from 29 developing countries and 16 developed countries. These results indicated that while substantial fertility declines were noted in Asia, the Pacific, Latin America, the Caribbean, and the Middle East, no fertility declines were found in Africa. Nearly half of the married women surveyed in 27 developing countries said they did not want any more children. Overall, 32 per cent of married, fecund women in developing countries are using contraception compared to an average 72 per cent in 16 developed countries. Education, literacy and more available family planning services increase contraceptive use. Age at marriage is rising, at least in Asia, but this factor alone has little effect on fertility. Infant mortality is higher in many developing countries than previously thought. Breastfeeding is an important restraint on fertility in most developing countries but is declining among more educated, employed and urban women which could raise fertility if not compensated for by gains in contraceptive use. (Author/MP)

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The World Fertility Survey: Charting Global Childbearing

By Robert Lightbourne Jr. and Susheela Singh with Cynthia P. Green

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Abstract—Interviewing some 350,000 women in 42 developing countries and 20 developed countries representing nearly 40 percent of the world's population, the World Fertility Survey is in a unique position to document the historic 1970s slowdown in global population growth. This *Bulletin* describes efforts begun in 1972 to ensure high-quality, internationally comparable, accessible data, the data's importance for policymakers, planners and researchers, and major findings available by early 1982 from directly assisted WFS surveys in 29 developing countries and contraceptive use data from WFS-type surveys in 16 developed countries. Marital fertility has declined in all developing regions except Africa but still averages from 4.6 children per woman in Latin American countries to 6.7 in Africa, while preferred family size ranges from 3.0 children in Turkey to 8.9 in Senegal—far above the average 2.2-2.5 children per woman needed to end developing countries' population growth in the long run. However, women aged 15-19 prefer nearly two children fewer than the oldest women aged 45-49—3.8 versus 5.7, on average. Nearly half (48 percent) of married women surveyed in 27 countries said they wanted no more children. Preventing all unwanted births would reduce birth rates up to 15 births per 1,000 population in these countries. Overall, 32 percent of married, fecund women in developing countries are using contraception compared to an average 72 percent in 16 developed countries. Education, literacy and more available family planning services increase contraceptive use. Age at marriage is rising in at least Asia, but this factor alone has little effect on fertility. Infant mortality is higher in many developing countries than previously thought. Breastfeeding is an important restraint on fertility in most developing countries but is declining among more educated, employed and urban women which could raise fertility if not compensated for by gains in contraceptive use.

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The World Fertility Survey: Charting Global Childbearing

By Robert Lightbourne Jr. and Susheela Singh, with Cynthia P. Green

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POPULATION BULLETIN
Vol. 37, No. 1, March 1982

Twenty-Nine World Fertility Survey Developing Countries Included in This Bulletin

AFRICA	LATIN AMERICA & CARIBBEAN	
KENYA	COLOMBIA	
LESOTHO	COSTA RICA	
SENEGAL	DOM. REPUBLIC	
SUDAN (North)	GUYANA	
	HAITI	
ASIA & PACIFIC	JAMAICA	
BANGLADESH	MEXICO	
FIJI	PANAMA	
INDONESIA	PARAGUAY	
REP. OF KOREA	PERU	
MALAYSIA	TRINIDAD & TOBAGO	
NEPAL	VENEZUELA	
PAKISTAN	MIDDLE EAST	
PHILIPPINES	JORDAN	
SRI LANKA	SYRIA	
THAILAND	TURKEY	

The World Fertility Survey: Charting Global Childbearing

By **Robert Lightbourne Jr.**
and **Susheela Singh**
World Fertility Survey
London, England

with **Cynthia P. Green**
Washington, D.C.

The World Fertility Survey (WFS) is the world's largest social science research project, encompassing 42 developing countries and 20 developed countries representing 39 percent of the world's population (see Table 1, page 4). By the end of 1982, almost 350,000 women throughout the world will have been interviewed in surveys conducted under WFS auspices. Their answers will provide the most complete picture to date of women's childbearing behavior and aspirations and will furnish policymakers with clues regarding policies and programs most likely to influence fertility.

Among the major conclusions to emerge from results available by March 1982 from surveys completed in 29 developing countries and 16 developed countries are:

- Substantial fertility declines (of at least one child per woman) have been recorded in Asia, Latin America and the Middle East, although the present average fertility of some 4.6 to 6.3 children per woman in those regions is still at least double the average of about two children in developed countries.
- No fertility decline was found in sub-Saharan African countries, where fertility ranged up to 8 children per woman (in Kenya).
- Nearly half of the married women surveyed in 27 developing countries said they wanted no more children. If all unwanted births were prevented, birth rates in these countries would fall by between 1.4 and 15.3 points (i.e. births per 1,000 population).
- Preferred family size in the 29 developing countries ranges from 3.0 children in Turkey to 8.9 in Senegal, with an overall average of 4.7. These levels are far above the average 2.2-2.5 children per woman needed in these countries to achieve a no-growth population in the long run.

Robert Lightbourne joined the World Fertility Survey headquarters staff in 1979. He holds the M.Sc. in demography from the University of the West Indies, Jamaica, obtained a Ph.D. in demography from the University of California, Berkeley, in 1977, and was assistant professor in sociology and urban studies at Howard University, Washington, D.C.

Susheela Singh has worked with the headquarters of the World Fertility Survey since 1978, after completing the Ph.D. in sociology at the University of California, Berkeley, in 1977. She is author of several papers in the WFS Comparative Studies *series and of other articles published in journals and by WFS.*

Cynthia Green is a population-communication specialist with the Population Crisis Committee, Washington, D.C. She holds a Master's degree in communication from Cornell University and is a Ph.D.candidate in sociology at American University. Author of more than 300 articles and 30 booklets, she has worked in the population field for 12 years and has served as a consultant to ten population organizations. During June-July 1980 she was seconded to the World Fertility Survey to coordinate media relations for the World Fertility Survey Conference.

Table 1. Countries Participating in World Fertility Survey: 1982

Region and country	Mid-1981 population estimate (millions)	Sample size	Year of field work
Developing countries			
Africa			
Benin	3.8	5,000	1981/2
Cameroon	8.7	8,129	1978
Ghana	12.0	6,114	1979
Ivory Coast	8.5	5,179	1980
Kenya	16.5	8,100	1977
Lesotho	1.4	3,603	1977
Mauritania	1.7	5,000	1981
Morocco	21.8	5,800	1981
Nigeria	79.7	11,000	1981/2
Senegal	5.8	3,986	1978
Sudan (North)	19.6	3,115	1978
Tunisia	6.6	4,118	1978
Asia and Pacific			
Bangladesh	92.8	6,513	1975
Fiji	0.6	4,928	1974
Indonesia (Java/Bali)	148.8	9,155	1976
Iran	39.8	4,878	1977
Korea, Rep. of	38.9	5,430	1974
Malaysia	14.3	6,316	1974
Nepal	14.4	5,940	1976
Pakistan	88.9	4,996	1975
Philippines	48.9	9,268	1978
Sri Lanka	15.3	6,812	1975
Thailand	48.6	3,778	1975
Europe			
Portugal	10.0	5,561	1979
Latin America and Caribbean			
Colombia	27.8	5,378	1976
Costa Rica	2.3	3,935	1976
Dominican Rep.	5.6	3,115	1975
Ecuador	8.2	6,950	1979
Guyana	0.9	4,642	1975
Haiti	6.0	3,365	1977
Jamaica	2.2	3,096	1975
Mexico	69.3	7,310	1976
Panama	1.9	3,701	1975
Paraguay	3.3	4,622	1979
Peru	18.1	5,640	1977
Trinidad & Tobago	1.2	4,355	1977
Venezuela	15.5	4,361	1977
Middle East			
Egypt	43.5	8,824	1980
Jordan	3.3	3,612	1976
Syria	9.3	4,487	1978
Turkey	46.2	4,431	1978
Yemen Arab Rep.	5.4	5,000	1979
Total in countries:	1,017.4 million		
Percent of 1981 developing country population (3,348 million):	30.4 percent		
Total women in samples:	229,633		
Developed countries			
Belgium (Flemish part)	9.8	4,877	1975
Bulgaria	8.9	6,000	1976
Czechoslovakia	15.4	3,041	1977
Denmark	5.1	6,000	1975
Finland	4.8	6,100	1977
France	53.9	3,511	1977
Hungary	10.7	4,009	1977
Israel	3.9	6,000	1973
Italy	57.2	5,500	1979
Japan	117.8	2,860	1974
Netherlands	14.2	4,522	1975
Norway	4.1	5,100	1977
Poland	36.0	10,000	1977
Romania	22.4	10,000	1978
Spain	37.8	6,222	1977
Sweden	8.3	5,000	1981
Switzerland	6.3	1,800	1980
United Kingdom	55.9	6,589	1976
United States	229.8	8,611	1976
Yugoslavia	22.5	7,500	1976
Total in countries:	724.8 million		
Percent of 1981 developed country population (1,144 million):	63.4 percent		
Total women in samples:	113,242		

Total population in participating countries: 1,742.2 million
Percent of 1981 world population (4,492 million): 38.8 percent
Total women in samples (world): 342,875

Source of population figures: Population Reference Bureau, *1981 World Population Data Sheet*.

Note: Surveys in two developing countries (Guadeloupe and Martinique and Hong Kong) were of associate status, carried out without direct support from WFS, as were the surveys in developed countries.

• About one-third of the married women surveyed in the 29 developing countries were using contraception, compared with an average of 72 percent in 16 developed countries.

In some countries, WFS findings have corroborated information gleaned from vital statistics registration systems and earlier surveys; in others the findings were completely unexpected, in terms of fertility rates both higher and lower than anticipated. WFS surveys have documented for the first time the extent and duration of breastfeeding in the developing world. Policymakers have been concerned by the evidence that the practice of breastfeeding is declining, since this may adversely affect infant health and may contribute to an increase in fertility if not compensated for by gains in contraceptive use.

Founded in 1972 as a project of the International Statistical Institute (ISI), the WFS was designed to meet the need for reliable, up-to-date information on human fertility. Its main objective was described as "carrying out nationally representative, internationally comparable, and scientifically designed and conducted surveys of human fertility behavior."[1] Other primary objectives were: to provide data needed by government planners in the social, economic, health and population fields; to advance scientific understanding of fertility behavior by providing comparable data for a large number of countries; and to increase the capability of countries to undertake demographic and other types of surveys.

The WFS was started at a time when fertility had begun to fall in many developing countries, after centuries of uniformly high fertility in most cultures. The sharp decline in Third World mortality rates since World War II, combined with continued high fertility, had sent population growth rates soaring. The world's population growth rate, which peaked in the mid-1960s at about 2 percent annually, began to decline in the 1970s decade, largely due to lower fertility rates in both developed and developing countries. The WFS was in a unique position to document these profound changes in fertility at an important point in the history of the world.

Policymakers and planners are using WFS results to develop policies and programs to influence fertility, to evaluate the effect of past policies and socioeconomic trends on fertility, and to gauge the prospects for future fertility declines. By comparing current fertility levels and family size preferences of young women with those of older women, the WFS surveys can assess current and past fertility trends and thus provide a benchmark to measure future trends. In many developing countries, the WFS results provided irrefutable evidence that fertility levels were higher than many government officials thought or deemed desirable in terms of national development.

Initial funding for WFS was provided by the United Nations Fund for Population Activities (UNFPA). Other major donors have included the United States Agency for International Development (USAID) and the Overseas Development Administration of the United Kingdom. The WFS works closely with the major international demographic research organizations, including the International Union for the Scientific Study of Population (IUSSP) and the United Nations Population Division.

WFS-sponsored surveys are carried out mostly by government statistical bureaus and other research organizations in the participating countries. For all developing countries except Iran, WFS provided technical and financial assistance, while the participating countries were responsible for collecting and analyzing the data. Portugal was the only European country to receive financial and technical assistance from WFS and to utilize the basic WFS questionnaire. The 20 developed countries participating in the WFS conducted national fertility surveys from about 1975 through 1981, broadly along the lines recommended by WFS. Since different questionnaires and

Table 2. Progress Status of Developing Countries Participating in WFS: March 1982

First report completed. Findings in this *Bulletin*	First report in progress	Expected completion date
Africa		
Kenya	Benin	May 1983
Lesotho	Cameroon	Dec. 1982
Senegal	Ghana	Aug. 1982
Sudan (North)	Ivory Coast	Jan. 1983
	Mauritania	Mar. 1983
	Morocco	Dec. 1982
	Nigeria	July 1983
	Tunisia	June 1982
Asia and Pacific		
Bangladesh	Iran[a]	
Fiji		
Indonesia		
Korea, Rep. of		
Malaysia		
Nepal		
Pakistan		
Philippines		
Sri Lanka		
Thailand		
Europe	Portugal	July 1982
Latin America and Caribbean		
Colombia	Ecuador	Sept. 1982
Costa Rica		
Dominican Rep.		
Guyana		
Haiti		
Jamaica		
Mexico		
Panama		
Paraguay		
Peru		
Trin. & Tob.		
Venezuela		
Middle East		
Jordan	Egypt	Dec. 1982
Syria	Yemen Arab Rep.	Dec. 1982
Turkey		

[a]Data processing believed to be in progress. Expected completion date unavailable.

measurement criteria were used in these surveys, they are not completely comparable to the WFS-supported surveys in developing countries. The U.N. Economic Commission for Europe is currently conducting comparative analyses of the WFS-type surveys carried out in Europe and the United States, with results to be published during 1982 and 1983 in a sub-series of the WFS *Comparative Studies* series under the title "ECE Analyses of WFS Surveys in Europe and USA."

All WFS-supported surveys in developing countries utilize a "core questionnaire" developed by WFS. This can be supplemented by "modules" covering additional areas related to fertility. All questionnaires are translated into local languages and dialects and administered by trained interviewers, predominantly females, whose work is closely monitored by field supervisors. Respondent refusal rates have been under 4 percent in all developing country surveys reported to date.

Fieldwork in developing countries began with surveys in Fiji, Malaysia and the Republic of Korea in 1974. By early 1982, 29 developing countries had "completed" their surveys, in the sense of having published a first report summarizing their major findings (see Table 2). Twelve of the remaining developing countries (with Iran excluded) expect to publish first reports by mid-1983. WFS-type surveys have been completed in 19 of the 20 developed countries. Sweden, the remaining country, will publish its results during 1982. Since WFS was more intensively involved in surveys conducted in developing countries, this *Bulletin* focuses on the most important findings for the 29 developing countries with completed surveys, with references to comparable findings, where available, from 16 developed countries.

The 42 developing countries participating in the WFS represent some 30 percent of the Third World's population (see Table 1). If China and India are excluded, their share is 61 percent. Many of them had never before had a national fertility survey. The major achievement of the WFS has been to channel the necessary funds and provide technical assistance to ensure that

high-quality, comprehensive data are produced and made accessible to planners, policymakers, researchers and others. Its achievements are all the more impressive in light of the high proportion of previous surveys in the Third World that were never completed or failed to publish results.

Background of WFS

When WFS was founded, detailed information on fertility in developing countries was very scarce. Some countries did not have even basic data on births collected through vital registration systems, while others had fairly complete vital statistics and census data but lacked the detailed information on fertility that can be compiled from sample surveys.

An inventory commissioned in preparation for the WFS found that only five developing countries and 13 developed countries had carried out national-level fertility surveys between 1960 and 1973, while nine others had made partial surveys (of a city or province, for example).[2] Thus, prior to 1974 the major sources of information on fertility trends in developing countries were censuses, vital registration and indirect estimates based on both. These sources tended to provide incomplete coverage of the population and to generate very little data on the factors influencing fertility.

Another advantage of the WFS is its very high completion rate. Only about half of all previous fertility-related surveys had actually yielded published results.[3] By contrast, with the exception of Burma and Chile, all WFS surveys undertaken to date have resulted in published reports or are expected to do so.

To provide the basic data needed to determine national fertility trends, the WFS was planned to use nationally representative samples. The major emphasis was placed on obtaining data to describe fertility, both past and present, and the immediate demographic factors that control fertility, such as age at marriage, contraception and breastfeeding. An analysis of secondary factors influencing fertility was considered less critical, although the core questionnaire included questions on such social and economic correlates of fertility as educational attainment and employment status.

A first major effort was to design the "core methodology," consisting of manuals on data collection, compilation and analysis, and basic questionnaires. Drafts of these documents were prepared by the WFS staff and outside experts and reviewed by a large number of experts throughout the world; more than 200 experts reviewed the basic questionnaire.

The WFS established headquarters in 1972 in London, England, under the directorship of Sir Maurice Kendall, the eminent British statistician. Sir Maurice oversaw the growth of the WFS from a tiny cadre of specialists to a professional staff of about 45, supplemented by hundreds of fieldworkers, statisticians and other experts in the participating countries. After Sir Maurice's retirement in 1980, Dr. Milos Macura served as interim Project Director. In July 1981, Dr. Dirk van de Kaa become WFS Project Director.

Overall guidance for WFS' program is provided by a Program Steering Committee, consisting of representatives of the U.N. Population Division, the U.N. Statistical Office, UNFPA, USAID and the United Kingdom Overseas Development Administration, as well as four leading demographers as individual members. In addition to laying down operational principles for the WFS, the Program Steering Committee has guided many facets of WFS' work: the system of depository libraries, plans for "archiving" data, dissemination of findings within countries, translation of basic documents, publication of an annual report, access to data by international researchers, and the need to publicize WFS findings as widely as possible. The

Committee also examines criteria for enrollment of new countries, reviews the progress of work in participating countries, and reviews questionnaires, modules and other basic documents.

Among the basic principles promulgated by the Program Steering Committee are: policy-relevant research is most important, although WFS must remain unbiased and should not advocate particular policies; national analysis should be done within each country whenever possible; comparative analysis should be undertaken by WFS and other international institutions; and access to data is granted only with the permission of the country that is the source of the data. From time to time, the Committee also decides on work priorities for the WFS staff. For example, priority was given in 1978 to completion of illustrative analyses to demonstrate the kinds of detailed analyses that can be made with WFS data and to publication of short summaries of country findings as such information became available.

A second committee, the Technical Advisory Committee, met between 1973 and 1977 to advise on all technical aspects of WFS surveys. The 12-member Committee consisted of internationally recognized demographers and statisticians who were nominated jointly by the ISI and IUSSP and served in their individual capacities. During 1973 and 1974, the Technical Advisory Committee reviewed all basic WFS documents, including the draft core questionnaire. The Committee also established the basic sampling requirements and suggested important modifications to the editing and coding manual and the core questionnaire. Other important functions of the Committee were supervising special studies such as post-enumeration surveys and reliability studies, reviewing drafts of the early *Technical Bulletins*, and recommending topics for further analysis. The Committee completed its work in 1977, having laid the groundwork for WFS' research and analysis procedures.

Organization

Each WFS-assisted survey is conducted by the national government itself, usually through its national statistical office. After the initial agreement to conduct a survey, WFS assists the participating country to design project proposals and to secure funding for the survey. WFS often acts as a mediator to simplify and shorten the process of obtaining approval for survey projects.

The most important and unique part of WFS' work is to provide technical assistance to national survey staff throughout the survey. For each survey, WFS assigns two staff members—a general coordinator and a data processing specialist. Other specialists assist as needed in areas such as sampling and interviewer training. Working closely with the national survey staff, WFS staff typically visit a country eight to 12 times over a two- or three-year period. The average visit lasts about three weeks.

WFS technical assistance is based on the WFS manuals and questionnaires, which lay out detailed guidelines that are adapted to each country's needs. Standardization of research techniques and questionnaires has greatly contributed to the smooth organization and management of the surveys and has saved considerable time and money. An added benefit is that results from different countries can be compared, so that for the first time large-scale international analyses of fertility can be made. WFS assistance was initially focused on data collection, but as surveys have been completed, the emphasis has shifted to data analysis and dissemination of survey findings within countries by sponsoring national meetings. Such meetings bring together leading planners, policymakers, demographers and other specialists to review the national survey findings and discuss their implications for national development.

Within each country, two administrators, usually from the national statistical office, are appointed to oversee the sur-

vey. The National Director, who is usually the director of the statistical office, provides overall coordination. Day-to-day management of the survey is the responsibility of the Survey Director, who usually works full-time on the survey. In most countries, the monetary value of government contributions of manpower and materials to the surveys is equivalent to the funds provided by the external donors. All survey staff, including interviewers, editors, coders and computer personnel, are generally nationals of the country in which the survey is being conducted.

Quality control

One of the noteworthy features of the WFS has been its emphasis on quality control, which has resulted in unusually accurate and reliable data. Procedures developed by WFS and almost universally adopted by participating countries were designed to minimize two possible sources of methodological error: (1) sampling bias, which results when the respondents interviewed differ significantly from the entire population they are intended to represent; and (2) nonsampling error, which can occur when a respondent gives incorrect answers, or when interviewers and data processors make errors in recording, editing, coding or punching responses.

To obtain nationally representative samples, the WFS began, wherever possible, with existing area sampling frames based on national census enumeration districts. Within the selected districts, WFS had to develop its own sampling frames. This often entailed drawing maps of remote rural areas and always included compilation of lists of dwellings and households. With their high quality and completeness, WFS sampling frames have been used in subsequent national and regional surveys, particularly contraceptive prevalence surveys, at considerable savings of time and money.

The sample sizes used in WFS-sponsored surveys are larger than those used

H. Jemai

Field staff study a sampling map during the Morocco survey. Careful selection of nationally representative samples is an important part of WFS quality control.

in many similar surveys. Most national samples include about 5,000 women, although the number has ranged from 3,000 to 11,000 (see Table 1). The samples are carefully drawn from all regions and socioeconomic strata of a country to ensure that they are as representative as possible. Probability sampling is used, in which each member of the population has a known chance of being selected. Thus, it is possible to calculate the range of results that could be produced due to chance variations in the sample selected. For example, if a survey in a given country finds that the average number of children ever born is 3.1 children per woman, the probability can be mathematically calculated that the actual figure for the total population deviates by 0.2 children per woman as a result of random variations in the sample. In interpreting this data set, it is important to understand that the actual average number of children born per woman could range from 2.9 to 3.3. The fairly large size of WFS samples helped to reduce the margin of possible sampling error. Ten of the 42 develop-

ing countries participating in the WFS have oversampled particular subgroups, such as women living in the jungle area of Peru or women living in urban areas, in order to draw more accurate conclusions than would be possible from the small number of these women included in the national sample. In calculating national estimates, data from oversampled groups are adjusted by weighting in order to produce nationally representative results.[4]

To ensure complete and accurate responses, the questionnaire is first pretested on a small sample of about 200 women. Based on these interviews, which are often tape-recorded to detect problems in answering certain questions, and on discussions between the field staff and survey leaders, the questionnaire is revised as necessary before the main fieldwork begins. If the changes are drastic, a second or even a third pretest is made. As a result of pretesting, for example, the Bangladesh questionnaire was reordered so that separated women would not be asked whether they were currently pregnant and newly married women would not be asked whether they had ever given birth. Also, the questions on abortion were moved to the end, since they were found to be sensitive and disruptive of the interview.

To further ensure accuracy and comparability of results, strong efforts were made to interview respondents in their own language. This required at least ten written versions of the questionnaire for surveys in the Cameroon, Ghana, Ivory Coast and Kenya, for example, and by now the WFS core questionnaire has been translated into more than 100 languages. Written translations were made whenever possible, with oral versions generally reserved for languages or dialects spoken by only small proportions of the population. The correctness of written translations was ascertained by translating the questions in the indigenous language back into the original language and by carefully double-checking the wording of translations.

To ensure consistent, accurate data compilation and analysis, manuals specifying uniform procedures for editing, coding and punching data were adapted to correspond to the questionnaire used. Similarly, standardized guidelines for computer processing, recoding, and data tabulation as well as for the preparation of a detailed descriptive summary of the survey results were prepared by WFS and were followed closely by most countries.

The quality of the data may vary among countries because of variable answers by respondents. For example, illiterate, rural people generally have difficulty providing accurate dates of events such as children's births.[5] While WFS attempted to reduce response errors by the careful training and supervision of interviewers and the clear phrasing of questions, some distortions inevitably result. Nevertheless, the application of sound data collection and analysis methodology should produce the best possible data for each country.

Fieldwork

In guiding the fieldwork, WFS introduced what was for most countries a major innovation: the principle that female interviewers be used. The rationale was that the core questionnaire contained delicate and personal questions that female respondents in most cultures would find offensive or embarrassing if asked by men. There was also concern that husbands would object or would insist on being present if male interviewers were used. On the other hand, many national survey organizations were uneasy about using female staff because it was thought that women having the necessary education would not readily accept the hardship involved in fieldwork, that women would need chaperoning, and that younger women would be unacceptable to older respondents, while older women would be more likely to be married and to quit their jobs due to their husband's objections to their long absences from home. Only the dropout

An interviewer practices for the survey in Ecuador, closely watched by a supervisor.

problem proved serious, but this might also have been a problem with male interviewers. Many national survey leaders also argued that male interviewers had always been used and therefore a corps of experienced male interviewers already existed and it would be economical to use them.

Despite these misgivings, only three developing countries have used some male interviewers—Ghana, Nepal and Nigeria. In Ghana, survey leaders thought women would speak more freely to males about personal matters because they would be afraid that female interviewers would gossip. A pilot study using both male and female interviewers found that 53 percent of the respondents preferred being interviewed by women, 18 percent preferred men, and 29 percent had no preference. Partly as a result of this study, implying that half of the respondents had no objection to a male interviewer, some male interviewers were used in the Ghana survey. In Nepal, female interviewers were used in the lowland regions, but males were used in the physically demanding hilly and mountainous regions. Analysis of the results from these two countries and Nigeria may determine whether there was any significant difference in the data obtained by male and female interviewers.

The use of female interviewers created a special problem of recruitment, since most experienced interviewers were male. Most countries advertised for female interviewers through newspapers and the radio, while others contacted universities and training institutions. Some countries arranged to assign staff members of the statistical office or other government offices. A few were able to recruit social or community workers, midwives, family planning workers or teachers on loan. Recruitment on the open market allowed for greater flexibility, since the executing agency could set its own conditions of employment, including pay scales.

In many countries, field supervisors and field editors were trained by acting as interviewers in the pretest. Field interviewers were trained intensively, usually over three weeks, through classroom lectures, mock interviews and practice interviews in the field. They were closely supervised and evaluated by senior staff as well as by their future supervisors, and tape recordings of interviews were used in most countries to check performance. Office editors, coders and punchers were also trained in their specific tasks.

The "team" approach used in conducting the fieldwork contributed to the accuracy and completeness of the surveys, since interviewers were closely supervised and could receive immediate answers to their questions and timely feedback on their work. Typically, two supervisors were assigned to a team of four to six interviewers.

As a result of these careful field techniques, the proportion of completed interviews was exceptionally high. Response rates were close to 100 percent in many countries and at least 90 percent in all countries, indicating that fewer than 10 percent of women selected to be interviewed could not be found even after several callbacks, re-

fused to be interviewed, or ended the interview before all questions were asked. This response rate is higher than that achieved in many developed countries or in other surveys in developing countries and reflects the quality of WFS' planning and fieldwork. The official nature of the surveys, which were carried out by government statistical agencies, doubtless also contributed to the high response rate.

The fieldwork staff proved to be dedicated and energetic, despite the many difficulties encountered, some of which are illustrated by the following anecdotes:

- In the small outer islands and inaccessible interiors of the main islands of Fiji, fieldworkers had to rely on local residents for food and housing. In appreciation for this hospitality, they would present a "Sevusevu," a ceremonial gift of shrub roots that are pounded and mixed with water for drinking, and other gifts such as tinned food and tobacco.
- In rural areas of the Dominican Republic, field staff carried drinking water with them but could not always take food because it would spoil in the tropical heat. Sometimes they went without food.
- In Nepal, one interviewer team subsisted on a bag of rice dropped by helicopter. Much of the interviewing required walking long distances and since the normal travel allowance did not apply, interviewers were paid a "hiking allowance" of two rupees per mile.
- In Morocco, interviewers had trouble locating Berber groups recorded with only one name in the previous census taken in 1971, since many tribes have four or five names. Eventually, most of the tribes were found to have resettled near their previous location.
- In Indonesia, interviewers had to use conversion tables to record accurate dates of past events, such as children's births. On the island of Bali, age is based on the Balinese year, which has 210 days—six months of 35 days each. In Java, some people use a combination of the Western year and the Muslim or Javanese month.
- In Fiji, two claims for workmen's compensation were filed—one by an interviewer who had been chased by a dog and had slipped on the pavement and the second by an interviewer who had twisted her ankle while walking on a slippery road.
- In Nairobi, Kenya, many working women could only be interviewed at night, and male staff and vehicles had to be provided to ensure the female interviewers' safety.
- In Guyana, data processing staff had to do most of their work late at night—the only time the government's computer was available. Some work was done on the computer belonging to the national bauxite company, located 75 miles from the capital.
- In Bangladesh, maps of household locations prepared to guide the field staff listed formal names rather than nicknames which would have been more useful for locating people, and also were often more artistic than factual.

It is a truly remarkable achievement for WFS to have mounted such extensive surveys and to have succeeded in obtaining such high-quality data in the face of so many physical, logistical and cultural obstacles.

Content of questionnaires

The data collection process for WFS-sponsored surveys in developing countries has two parts: the household interview, which is used to identify women who are eligible for the detailed interview, and the individual interview with detailed questions related to fertility. The household interview lists household members in order to identify women of reproductive age (defined as 15-49) who are or have been married (or lived in consensual union)[6] and collects data on the age, sex and marital status of household members in order to determine the general characteristics of the base population to which fertility measures are related. It also provides

useful contextual data on factors that might relate to fertility and mortality, such as ownership of modern objects, and housing conditions. The household interview could also include questions on fertility and mortality or other topics not well covered by existing data sources. If a larger than normal sample were selected, the interview could serve as a mini-census.

The individual interview, which is the basic part of all WFS surveys, asks for a detailed chronological list of all births to each woman, her marital history, her knowledge and use of contraception, and her attitudes regarding family size. It also covers socioeconomic characteristics of the woman and her husband such as education, childhood residence and employment. An entire section is devoted to female employment because of its special importance to fertility. These topics make up the "core questionnaire," which is considered essential for all countries. Countries are free to add questions of particular interest on, for example, ethnicity, religion, migration, and maternal and child health. Most countries followed the recommended format quite closely for the core questionnaire topics, so that the resulting data are comparable. Interviews using the core questionnaire alone lasted about half an hour, but use of modules could extend the interview to 50 or 60 minutes.

Enrique Carrasco

Interviewers leave a training session for the Nigeria survey. WFS fieldwork staff proved to be dedicated and energetic in the face of many obstacles.

WFS also prepared seven supplementary modules to explore fertility-related topics in more depth which countries were free to adopt as they wished, either in part or entirely. The seven modules deal with:

(1) **Family Planning,** which covers knowledge and use of contraceptive methods and sources of supplies;

(2) **Fertility Regulation,** which collects detailed data on contraceptive use in relation to family size preferences;

(3) **Abortion,** which probes the respondent's previous use of induced abortion and attitude toward it;

(4) **Factors Other than Contraception Affecting Fertility,** which collects information on breastfeeding, postpartum amenorrhea, abstinence, age at menarche and at menopause, and temporary separations of the couple;

(5) **Community-level Variables,** which encompasses educational, health, transportation and communication services in the community, agricultural and/or industrial development levels, electricity and water supplies, and overall levels of health and education (usually tailored to a specific country and asked of local officials);

(6) **Economic Variables,** comprising a set of three modules on family income, asset holdings, and economic costs and benefits of children; and

(7) **General Mortality,** which includes questions on orphanhood, survival of spouses, and deaths of household members in the 24 months preceding the interview, in order to calculate estimates of infant, child and adult mortality.

Indonesia's March 1979 meeting to announce its WFS results was opened with a flourish by the Minister for People Welfare.

Used by more than 20 developing countries as of early 1982, the Family Planning and Fertility Regulation modules have been the most popular, especially among Asian, Latin American and Caribbean countries. The module on Factors Other than Contraception Affecting Fertility was most popular among the African countries. Except for the economic modules (used by only eight countries), all the modules were used by about half or more of the countries.

Use of WFS data by policymakers

Data from WFS surveys have been used for a wide variety of applications by political leaders, government officials, university researchers, planners, social service organizations, businesses and teachers. Upon publication, results from each developing country have been announced at a large briefing, usually attended by cabinet ministers and other high-level government officials, as well as media representatives and other interested individuals. Thus, the WFS findings are disseminated in a timely manner and can be immediately put to use by both the public and private sectors.

For most developing countries, the WFS surveys provide the most accurate and comprehensive information available to date on fertility trends, infant mortality, health care and other socioeconomic indicators. Such information has many applications. For example, up-to-date estimates of fertility levels can be used to make population projections which form the basis for planning for school enrollment, labor force trends and the provision of all basic government services.

Often the WFS findings will identify a need for expanded services or a shift in emphasis in government programs. In several countries, WFS findings revealed higher than expected levels of infant mortality, which will have major implications for the delivery of health care services and public programs for child care and nutrition. By contrast, the WFS survey in Paraguay found that prenatal and postnatal care services in 1979 had already exceeded the target level set for 1981 but that more attention was needed in rural areas and among women who had already had several children, very young mothers, and older women having their first child, since infant mortality was higher among these groups.

In particular, policymakers have used the WFS findings to evaluate, design and modify family planning programs. For example, the 1976 Indonesian survey in Java and Bali found that 18 percent of married, fertile women could not identify a single contraceptive method and that among fertile women who wanted no more children, 47 percent were not using contraception. These women constituted special target groups for the expansion of family planning services and information. Similarly in the Philippines, women who marry early and have large numbers of children were identified as a prime target group for

the national family planning program. The Philippine WFS results also suggested that breastfeeding should be more widely promoted and that voluntary sterilization, especially for males, and other modern contraceptive methods besides the pill and IUD were more acceptable than program administrators had thought.

The finding of the Nepal survey that contraceptive knowledge and use were extremely low was used to justify increased efforts in communication and service activities of the agencies responsible for family planning and maternal and child health. In Kenya, the survey showed that the current average family size was about eight children—a much higher level than expected. This information gave a strong impetus to the government to broaden its support of family planning. A series of articles on the WFS findings and their implications for planning appeared in the Kenyan *Journal of Social Perspectives*, a government publication. The Dominican Republic's 1975 survey revealed a very high level of overall knowledge of contraception and unexpectedly high rates of female sterilization. On the basis of these findings, the government agencies responsible for family planning shifted their educational program from promotion of the general idea of family planning to emphasis on more detailed information about the characteristics and proper usage of specific contraceptives, and they added female sterilization to the services provided in 30 government clinics throughout the country. A second survey conducted five years later indicated the success of these policy changes. The proportion of currently married women who were sterilized had risen from 12 to 21 percent and fertility had declined substantially. In Haiti, the survey's results were used to assess the effects of various types of family planning programs. Senegal's survey was completed just as the government had decided to launch an active family planning program; the survey's results formed the basis for the program's structure and format.

In addition to providing direction to family planning and maternal and child health care programs, WFS results can serve as a baseline in order to measure the impact of such programs and to assess future fertility and infant mortality trends. Based on the WFS methodology and sample frames, a number of smaller contraceptive prevalence surveys have been conducted to assess fertility and contraceptive use trends during two- to five-year intervals following the WFS survey. Some 22 developing countries have indicated their interest in having a second round of WFS surveys, and several countries have conducted followup surveys at their own initiative.

Major WFS Findings in 29 Developing Countries

The following major findings from the 29 WFS surveys in developing countries completed by March 1982 cover four countries in Africa, nine countries in Asia and Fiji in the Pacific (listed together as "Asia and Pacific" in the tables), 12 countries in Latin America and the Caribbean, and three in the Middle East (Jordan, Syria, and Turkey). Also included are findings on contraceptive use in 16 developed countries from the first report of the Economic Commission for Europe comparative analysis of survey findings from developed countries participating in the WFS.[7] The WFS survey results provide a much more comprehensive and detailed assessment of fertility trends than was previously possible. As a result, generalizations regarding fertility can be made with more confidence, while at the same time the complexity of this subject is reflected in the research findings.

Table 3. Current Fertility, Children Ever Born to Women Aged 45-49, Infant and Child Mortality Rates

(Current fertility is average for 0-3 years before survey; mortality is average for 0-4 years before survey.)

Region and country	Survey year	Crude birth rate[a]	CBR standardized[b]	Total fertility rate[c]	Mean number of children per woman aged 45-49	Infant mortality rate[d]	Child mortality rate[e]
Africa							
Kenya	1977/8	48	46	8.0	7.9	87	142
Lesotho	1977	44	42	5.9	5.3	126	174
Senegal	1978	51	52	7.1	7.1	112	262
Sudan (North)	1978/9	39	39	5.7	6.0	79	147
Regional average				6.7			
Asia and Pacific							
Bangladesh	1976	43	43	5.9	6.8	135	222
Fiji	1974	31	31	4.1	6.4	47	59
Indonesia	1976	32	34	4.3	5.1	95	159
Korea, Rep. of	1974	29	29	4.0	5.8	42	56
Malaysia	1974	32	33	4.5	6.1	36	50
Nepal	1976	47	46	6.2	5.8	142	235
Pakistan	1975	40	45	5.9	6.8	139	207
Philippines	1978	34	35	5.1	6.6	58	93
Sri Lanka	1975	28	25	3.5	5.8	60	86
Thailand	1975	31	31	4.3	6.4	65	91
Regional average				4.8			
Latin America and Caribbean							
Colombia	1976	34	34	4.5	6.1	70	108
Costa Rica	1976	27	27	3.5	6.1	53	61
Dominican Rep	1975	40	41	5.4	6.5	89	129
Guyana	1975	31	32	4.6	6.5	58	77
Haiti	1977	37	37	5.5	5.8	123	191
Jamaica	1975/6	28	30	4.6	5.5	43	56
Mexico	1976/7	40	43	5.9	6.7	72	96
Panama	1975/6	28	30	4.0	5.7	33	46
Paraguay	1979	35	35	4.9	6.2	61	85
Peru	1977/8	36	38	5.3	6.2	97	149
Trin. & Tob.	1977	24	24	3.1	5.8	43	50
Venezuela	1977	34	—	4.3	6.1[f]	53	64
Regional average				4.6			
Middle East							
Jordan	1976	45	53	7.2	8.5	66	80
Syria	1978	45	48	7.5	7.6	65	87
Turkey	1978	32[g]	—	4.3	6.3	133	166
Regional average				6.3			

Sources: Robert Hanenberg, "Current Fertility," *WFS Comparative Studies*, No. 11, 1980; Shea Rutstein and Hoda Rashad, "Differentials in Infant and Child Mortality," *WFS Comparative Studies*, forthcoming 1982; and WFS data tapes.

[a] Annual births per 1,000 population.

[b] Standardized to population of Fiji, which has the classic age structure of a rapid growth population and a smooth age distribution, and where the first WFS survey was conducted.

[c] Births per woman aged 15-49. For definition, see text page 17.

[d] Deaths to infants under age one per 1,000 live births.

[e] Deaths per 1,000 children aged 0-4, i.e. includes infant mortality.

[f] Age group 40-44; sample did not include women aged 45-49.

[g] For 1978 only, from *Country Report*, Vol. 1. Note: Regional averages for total fertility rate weight each country equally.

Fertility levels and trends

By combining data from respondents' birth histories and basic information obtained in the household interviews, several well-known measures of "period" or current fertility can be calculated, including the crude birth rate (annual births per 1,000 population) and age-specific fertility rates (annual births to women in a specific age group per 1,000 women in that age group).[8] In addition, an index of fertility change can be constructed by comparing the average number of children ever born per woman aged 45-49 at the time of the survey with an estimate of the current fertility level as measured by the total fertility rate averaged over the three years before the survey. The total fertility rate, or birth rate per woman aged 15-49, indicates the average number of children women would have by age 49 if they bore children at the current age-specific rates of fertility. The fertility measures based on actual responses in WFS surveys are often found more reliable than those published by various international sources, which are mostly based on assumptions regarding past and future trends and may vary greatly.

Current fertility levels. For most of the 29 developing countries with completed WFS surveys, current fertility levels far exceed those required to attain moderate population growth, let alone an eventual end to population growth. In these countries, fertility would have to be sustained at the "replacement" level of 2.2 to 2.5 births per woman for up to 60 years before annual births and deaths would come into balance. (The difference in the range of "replacement-level fertility" depends on current mortality levels, which are higher in developing than in developed countries. In developed countries today, replacement-level fertility is 2.1 births per woman.)

Fertility levels are highest in Africa, where the average total fertility rates for women aged 15-49 in the three years before the WFS survey ranged from 5.7 children per woman in Sudan (North) to 8.0 in Kenya, as seen in Table 3. Fertility is only slightly lower in the Middle East, where the total fertility rate is 6.3 (weighting each country equally), compared with the average of 6.7 in the four African countries. The average total fertility rate of the Asia and Pacific countries—4.8 children per woman—is only slightly higher than that of Latin America—4.6. However, both regions have great variations in fertility, from a total fertility rate of 3.1 in Trinidad and Tobago and 3.5 in Sri Lanka to 5.9 in Bangladesh, Mexico and Pakistan and 6.2 in Nepal.

Current fertility levels as measured by crude birth rates also vary among the countries. Some differences among countries in their crude birth rates are due to differences in the proportions of women in the childbearing ages. By applying various countries' age-specific birth rates to a standard population, the effect of population age structure can be eliminated. Column 2 of Table 3 shows the crude birth rates of the 29 countries standardized to Fiji's age structure. When standardized, the birth rates for Jordan, Mexico, Pakistan and Syria are considerably higher than the unstandardized average crude birth rates for the three years before the survey shown in column one. The standardized birth rates indicate that a number of developing countries had achieved moderate fertility levels (crude birth rates between 24 and 35 per 1,000 population) in the mid- to late 1970s, but ten of these 29 countries still had very high fertility levels (crude birth rates of 40 or more). No country had reached the low level of fertility found in most developed countries. (The U.S. birth rate in 1981, for example, was 15.7.)

Fertility change. Turning to evidence of fertility change, no fertility decline was found in three of the four African countries—Kenya, Lesotho and Senegal—when current total fertility rates are compared with the mean number of children per woman aged 45-49. In fact, the

results shown in Table 3 for Kenya and Lesotho indicate that either fertility has increased slightly or women aged 45-49 failed to report all their births. In Sudan (North), this comparison shows a small decline in fertility, but this was most likely due to errors in the dating of births.

Misdating of births would not normally affect fertility change measured by comparing the current total fertility rate with the average number of children born to women aged 45-49. In fact, the omission of births to women aged 45-49 would cause the observed decline in births to be understated, while misdating of births would not affect the total number of children reported. The only exceptions here were Bangladesh and Sudan (North), where the reporting of recent births suffered both from being dated too early and from some omissions.

In contrast to Africa, most of the 13 Asian and Pacific and Middle Eastern countries had had some decline in fertility; the exceptions were Bangladesh, Nepal and Syria. Some of these declines were large, with current fertility levels between one and two children lower than the fertility of women aged 45-49. From previous studies, fertility declines of this size were expected for seven of these countries—Fiji, Republic of Korea, Malaysia, Philippines, Sri Lanka, Thailand and Turkey. The unpredicted, modest declines in Indonesia and Pakistan are supported by other evidence. The apparent decline from 6.8 to 5.9 children recorded in Bangladesh appears to reflect both a real, temporary decline resulting from the famines of the early 1970s and misdating of births, which causes current fertility to appear too low. Nepal's apparent slight increase probably resulted from women aged 45-49 failing to report all their births.

Among the Latin American and Caribbean countries, large declines of between 1.5 and 2.5 children per woman were found in Colombia, Costa Rica, Guyana and Panama, as had been expected from earlier studies. Fertility declines were also documented in the Dominican Republic, Haiti, Jamaica, Mexico and Peru, where no definite measurement of decline had been available before the WFS surveys.

Another way to assess fertility change from WFS data is to look at the number of births to each woman as of age 35 by five-year periods, beginning with the period 15-19 years before the survey, as shown in Table 4. This method uses the birth history data collected about each of a woman's births in turn. Since women are asked to recall births occurring as far back as 20 years before the survey, omission and misdating of births, particularly by older women, affects this measure of fertility change more than the comparison of the total fertility rate in the three years before the survey with the average number of children ever born to women aged 45-49. Misdating of births usually consists of reporting that births occurred closer to the time of the interview than they actually did. A first birth may be dated later than it occurred, compressing subsequent births into a shorter time span and creating the impression that fertility was higher 10-14 years before the survey than in the period 15-19 years before the survey. This type of error may account for some of the apparent increases in fertility between these two time periods shown in Table 4 for Kenya, Sudan (North), Bangladesh, Jamaica and Syria.

Detailed evaluations of WFS data show that omission of births is not usually a serious problem, although some misdating of births was detected. Comparisons of WFS survey results with data from other sources have found that WFS surveys, using the birth history technique, have achieved more complete coverage of births than censuses or other surveys.[9]

According to the data shown in Table 4, fertility was stable over the 20 years before the WFS surveys in three countries—Lesotho, Senegal and Nepal. It is

Table 4. Fertility Trends Over the 20 Years Before the Surveys

(Births per woman by age 35 for five-year periods before the survey)

Region and country	Survey year	Years before the survey			
		15-19	10-14	5-9	0-4
Africa					
Kenya	1977/8	*6.0*	*6.6*	*6.3*	*5.9*
Lesotho	1977	4.0	4.2	4.1	4.3
Senegal	1978	5.7	5.6	5.5	5.5
Sudan (North)	1978/9	*4.8*	*5.4*	*5.4*	*4.6*
Asia and Pacific					
Bangladesh	1976	*5.9*	*6.6*	*7.0*	*5.6*
Fiji	1974	5.5	5.3	4.2	3.5
Indonesia	1976	4.6	4.6	4.4	3.9
Korea, Rep. of	1974	4.4	4.2	3.7	3.6
Malaysia	1974	5.2	4.9	4.3	3.7
Nepal	1976	4.7	4.7	4.8	4.8
Pakistan	1975	5.6	5.6	5.6	5.1
Philippines	1978	5.1	4.9	4.6	3.8
Sri Lanka	1975	4.6	4.3	3.7	2.9
Thailand	1975	5.0	4.8	4.4	3.4
Latin America and Caribbean					
Colombia	1976	5.6	5.3	4.6	3.6
Costa Rica	1976	5.5	5.4	4.0	3.3
Dominican Rep.	1975	5.5	6.0	5.5	4.6
Guyana	1975	5.7	5.6	5.0	4.2
Haiti	1977	4.5	4.2	3.9	3.8
Jamaica	1975/6	4.9	5.3	4.8	4.1
Mexico	1976/7	5.5	5.5	5.3	4.8
Panama	1975/6	4.8	4.8	4.5	3.8
Paraguay	1979	4.7	4.4	4.1	3.8
Peru	1977/8	5.2	5.0	4.7	4.1
Trin. & Tob.	1977	5.1	4.4	3.3	2.8
Venezuela[a]	1977	—(4.0)	5.0(3.6)	4.5(3.3)	3.7(2.8)
Middle East					
Jordan	1976	6.7	6.9	6.5	5.8
Syria	1978	*5.7*	*6.1*	*5.6*	*5.4*

[a]45-49 age group was not interviewed, therefore cumulative fertility up to age 35 is not available for 15-19 years before survey. Comparable data are shown for periods up to 10-14 years before survey, and cumulation up to age 30 is given for all periods.

Note: Data are not available for Turkey. Italics indicate that the data on trends have defects or that the data have not yet been evaluated.

also unlikely that any fertility decline occurred in four countries where the data on fertility trends are of uncertain quality or have not yet been evaluated—Kenya, Sudan (North), Bangladesh and Syria. (Data for these four countries are italicized in Table 4.) In most Asian countries, fertility began to decline in

the late 1950s—i.e. the rates drop steadily from 15-19 to 0-4 years before their surveys. The exceptions are Indonesia, Jordan and Pakistan, where marked fertility declines began only in the late 1960s, 5-9 years before their surveys. A few Latin American countries—Colombia, Costa Rica, Paraguay and Peru—began well-established fertility declines in the late 1950s or early 1960s. The decline began in the mid-1960s in other countries of that region—the Dominican Republic, Guyana, Mexico and Panama.

The fertility declines recorded by the WFS are in most cases well documented by now. However, the declines recorded in Indonesia, Pakistan, Mexico and Jordan are so recent and small that later data will be needed to confirm the WFS survey findings. In the Dominican Republic, the 1975 WFS survey data left some doubts about the fertility decline, but a second survey taken in 1980 confirmed that fertility had indeed been declining since the late 1960s.

Timing of childbearing. The timing of childbearing, as measured by current fertility rates for women in specific age groups, shows considerable variation among the 29 countries, as seen in Table 5. In countries where women marry young, fertility rates are high for women aged 15-19—generally 100 or more births per 1,000 women of this age. (A rate of 100 indicates that one in ten women in this age group gives birth each year. The rates shown are for all women, whether or not they have ever married.) A few countries (Fiji, Haiti, Malaysia, Philippines, Sri Lanka and Thailand)—all with a high mean age at marriage—had rates of under 70 for women aged 15-19. At the time of its 1974 survey, the Republic of Korea had an extraordinarily low rate of 11 for women aged 15-19. (In the United States, the 1978 fertility rate for women this age, whether or not married, was 52.[10])

Among women aged 40-44 and 45-49, low fertility rates were found in several Asian countries, including those with high overall fertility, such as Bangladesh and Pakistan. The explanation for this may be that in much of Asia there is a stigma attached to women who continue to have children after their own children have started childbearing; these older women have traditionally controlled their fertility through abstinence.

The patterns in the age-specific rates shown in Table 5 indicate that as countries experience declining fertility, reproduction becomes increasingly concentrated in a narrow age range, usually at ages 20-29. Countries which show this pattern of large differences between the rates for women 20-29 and rates in the 15-19 and 30-34 age categories are: Colombia, Fiji, Korea, Malaysia, Panama, Paraguay, Thailand and Turkey—all of which have had large declines in fertility. Exceptions to the 20-29 peak age of childbearing are found among some countries with large fertility declines, usually where the age at marriage is either very delayed or very early. In the Philippines and Sri Lanka, where substantial proportions of women marry after age 30, peak fertility is delayed to ages 25-34. A few countries which had substantial fertility declines, but still had a low age at marriage, tended to have peak fertility at ages 20-24; such countries include the Dominican Republic, Guyana, Jamaica and Panama. In contrast, some high fertility countries, such as Jordan, Lesotho, Nepal, Pakistan, and Syria, have high fertility rates over a wider age range, generally 20-34.

Fertility differentials

The influence of social and economic characteristics on the number of children couples have is an important area of research because of its implications for government policies and programs. Differences in fertility among socioeconomic subgroups have been observed in many countries, even those with high, stable fertility. However, direct evidence of the effects on fertility

Table 5. Current Age-Specific Fertility Rates

(Annual births per 1,000 women in each age group, averaged over 3-year period before the survey)

Region and country	Survey year	Age at time of interview						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Africa								
Kenya	1977/8	168	343	356	293	239	145	56
Lesotho	1977	102	270	261	248	170	86	37
Senegal	1978	197	305	335	269	187	100	33
Sudan (North)	1978/9	99	249	275	239	136	102	32
Asia and Pacific								
Bangladesh	1976	253	302	250	198	120	53	10
Fiji	1974	59	240	218	160	90	38	8
Indonesia	1976	117	235	209	144	97	46	17
Korea, Rep. of	1974	11	181	305	188	82	32	5
Malaysia	1974	59	226	240	195	135	35	11
Nepal	1976	133	290	292	247	163	82	29
Pakistan	1975	141	274	294	249	169	56	6
Philippines	1978	49	204	250	234	172	84	22
Sri Lanka	1975	31	143	193	178	112	41	11
Thailand	1975	65	205	208	167	135	66	15
Latin America and Caribbean								
Colombia	1976	98	220	215	170	127	53	24
Costa Rica	1976	(80)[a]	194	165	123	77	48	9
Dominican Rep.	1975	116	277	249	212	166	55	13
Guyana	1975	119	262	233	167	94	32	5
Haiti	1977	57	203	256	232	179	110	54
Jamaica	1975/6	133	249	214	159	106	54	13
Mexico	1976/7	112	283	278	235	171	77	17
Panama	1975/6	(80)[a]	227	198	152	99	36	4
Paraguay	1979	85	220	230	199	150	76	15
Peru	1977/8	79	227	255	228	166	84	25
Trin. & Tob.	1977	69	173	160	114	72	24	7
Venezuela	1977	93	223	206	177	103	62	—[b]
Middle East								
Jordan	1976	110	336	361	313	225	84	19
Syria	1978	117	302	346	310	246	130	43
Turkey[c]	1978	97	254	221	152	96	40	2

[a] 15-19 group was not interviewed. Rate was estimated from lowest Latin American rate (Peru).

[b] Age group 45-49 was not interviewed.

[c] For 1978 only, from *Country Report*, Vol. 1.

of such changes as increases in the proportions of women with secondary school education, living in urban areas, or employed outside the home is scarce for developing countries and often contradictory. The WFS surveys collected more comprehensive information than had been previously available and for the first time provide internationally comparable data on which to base broad generalizations.

Women's education. Table 6 shows fertility differentials by education and place of residence for ever-married women aged 30-34. In general, the average number of children per woman declines as the woman's level of education increases. Differences in fertility by level of education can be seen in countries with little or no fertility decline, although they are greater in countries that have had substantial fertility de-

Table 6. Fertility Differentials by Education and Residence

(Average number of children ever born per ever-married woman aged 30-34 at time of interview)

Region and country	Education[a]			Residence	
	None	Primary	Secondary and higher	Rural	Urban
Africa					
Kenya	5.6	5.7	5.0	5.7	5.1
Lesotho	4.2[b]	4.0	2.9[b]	4.0	3.9
Senegal	5.4	5.1	3.1	5.3	5.2
Sudan (North)[c]	4.9	5.8	3.9[b]	5.0	5.0
Asia and Pacific					
Bangladesh	5.7	5.7	4.9	5.7	5.6
Fiji	4.8	4.2	3.1	4.4	3.8
Indonesia	3.9	4.3	3.6	4.0	3.9
Korea, Rep. of	4.1	3.6	2.7	3.8	3.1
Malaysia	4.7	4.4	2.6	4.6	3.7
Nepal	4.1	3.5	3.5	4.1	4.0
Pakistan	5.0	5.2	3.9	4.8	5.4
Philippines	4.5	4.7	3.5	4.6	3.6
Sri Lanka	4.7	4.3	3.0	3.8	3.7
Thailand	4.8	3.9	2.2	4.1	3.0
Latin America and Caribbean					
Colombia	5.9	4.6	3.1	5.5	4.0
Costa Rica	5.1	4.3	2.6	4.9	3.1
Dominican Rep.	5.4	5.0	2.5	5.5	4.3
Guyana	5.5	5.1	3.6	5.3	4.1
Haiti	3.6	3.4	2.5	3.6	3.3
Jamaica	—[d]	4.5	2.2	4.8	3.5
Mexico	6.0	5.1	2.9	5.5	4.6
Panama	5.1	4.7	3.0	4.9	3.4
Paraguay	5.1	4.3	2.2	4.7	2.9
Peru	5.4	4.9	3.1	5.1	4.2
Trin. & Tob.	—[d]	3.8	2.2	3.9	2.9
Venezuela	5.8	4.5	2.5	5.9	3.8
Middle East					
Jordan	6.4	5.3	3.4	6.3	5.7
Syria	5.6	5.2	4.1	5.6	4.9
Turkey[e]	4.3	2.9	1.7	4.2	3.0

[a] "Primary" includes completed primary school and less; "Secondary and higher" includes all other educational levels attained.

[b] 20-50 cases.

[c] Completed primary school is included in "Secondary and higher" category.

[d] Less than 20 cases. [e] Age group is 25-34.

clines. For example, in Colombia, where fertility has declined markedly, women with no education have an average of 5.9 children—2.8 more than those with at least some secondary education (3.1). In Kenya—where fertility has probably not declined—the difference is only 0.6 children per woman (5.6 versus 5.0 children). The difference between the lowest and highest education groups is greatest in Latin America—as large as 3.1 children per woman in Mexico. In the other three regions, the differences range from 0.5 to 2.0 children per woman, except for Jordan, which had a difference of 3.0 children per woman, and Turkey, which had a difference of 2.6.

Among these 29 developing countries for which WFS results are available, women aged 30-34 who had attended secondary school had an average 2.2 to 3.5 children each, with the exception of Bangladesh (4.9), Kenya (5.0), Pakistan (3.9), Syria (4.1), and Turkey (1.7). In contrast, women with no education generally had an average of 5-6 children in Africa and Latin America and 4-5 children in Asia and the Pacific.

A reversal in the pattern of declining fertility as education increases was observed in five countries—Indonesia, Kenya, Pakistan, Philippines and Sudan (North). In these countries, women in the primary school category had higher fertility than those with no education. The explanation for this may be that women with a few years of primary schooling are more likely to discontinue traditional practices such as breastfeeding and abstinence following a birth, which serve to decrease fertility by increasing the interval between births. However, it is likely that overall completed fertility may not differ greatly between the two groups, since women with a primary-level education are more likely than uneducated women to limit their fertility after the age of 35.

These reversals in the effect of education on fertility suggest that small increases in female education may not be sufficient to cause fertility declines. In countries where other socioeconomic changes are taking place, improved education may not even be necessary for fertility decline. For example, in Colom-

bia fertility declined among women with no education as well as among those with primary and secondary schooling, although there was a lag of about ten years. Nevertheless, increased education usually results in lower fertility because more educated women tend to marry later, to be employed outside the home, to appreciate the advantages of restricting family size, and to practice contraception effectively.

An analysis of WFS data for 20 countries by WFS staff demographers Germán Rodriguez and John Cleland found that when the effects of area of residence and the socioeconomic status of husbands were controlled, the effect of wives' education was considerably reduced.[11] This finding implies that women's education partly reflects the overall socioeconomic status of the couple. Significant education differences remained for about one-half of the countries studied, however, indicating that women's education does have some independent influence on fertility. Furthermore, there is some evidence that fertility differentials by education have widened in recent years, which suggests that education could play an increasingly important role in future fertility trends.[12]

Place of residence. Differences in fertility according to urban-rural residence were not as large as those by educational level. The differential was more pronounced and universal in Latin America, where ever-married urban women aged 30-34 had an average of one child less than similar rural women (see Table 6). In Africa and Asia and the Pacific, the differences were smaller and less widespread, with urban women generally having about 0.5 children less than rural women; larger differences were observed in the Philippines, Thailand and Turkey. These regional variations can be explained almost entirely by differential use of contraception and breastfeeding.

Urban residence made almost no difference in Bangladesh, Indonesia, Lesotho, Nepal, Senegal, Sri Lanka and Sudan (North). Possible explanations for this finding are that there is very little qualitative difference between urban and rural areas, that urban growth has been very recent in these countries, that the difference between urban and rural areas has evened out after large fertility declines, or that a difference will emerge after women have completed their families, i.e. by ages 45-49.

In Pakistan, urban women actually had higher fertility than women living in rural areas. This may be due to the breakdown in urban areas of traditional practices such as breastfeeding which have depressed fertility in the past.

The Rodriguez-Cleland study found that when education and employment of both husbands and wives were controlled, the effect of urban-rural residence on recent marital fertility was halved.[13] This suggests that only about half of the observed urban-rural differential is due to the characteristics of urban life itself, such as the higher net cost of children, selectively of urban migrants, the weakening of traditional pronatalist values, and better access to means of fertility control.

Women's employment. In general, married women who work outside the home have smaller families than women who do not. According to WFS findings, women who work for nonfamilial employers have the lowest fertility, followed by women employed by their family and those who are self-employed; unemployed women have the highest fertility. Nonfamilial employment had a stronger effect on recent marital fertility in Latin America than it had in Asia and the Pacific. Even after controlling for residence, wife's education and husband's socioeconomic status, significant differences by employment status persisted in two-thirds of the 20 sample populations studied by Rodriguez and Cleland.

The direction of the employment-fertility relationship has been called into question by an analysis of WFS data for the same 20 developing countries by

the U.N. Population Division that found that contraceptive use was only slightly higher among employed women than among unemployed women.[14] If women working outside the home are not more likely to use contraception than non-working women, their lower fertility may not be entirely voluntary; that is, employment may be the result of infertility or smaller family size rather than a cause of reduced fertility.

Rodriguez and Cleland pulled together the interrelated WFS socioeconomic data into a single typology, classifying couples into seven types, from the most traditional (couples living in a rural-agricultural setting with both spouses uneducated) to the most modern (urban-nonagricultural setting, both spouses with upper primary or more education, the wife engaged in nonfamilial work). Treating all 20 developing countries together, they found a consistent decline in fertility from 6.9 children for the most traditional couples to 4.2 children for the most modern group. The size and pattern of the differences varied least within the populations of the more homogeneous Asian and Pacific countries and most in the Latin American and Caribbean countries. Although the data measure differences among population subgroups and countries at one point in time, these findings do offer guidelines for policymakers who may wish to influence fertility trends over time.

Infant mortality and fertility

Among the 29 developing countries for which WFS results are available, there is a strongly significant statistical correlation between the infant and child mortality rates and the current total fertility rates shown in Table 3 (page 16). Countries with relatively lower fertility (around 4.5 or fewer births per woman) generally have relatively low infant mortality (60 or fewer infant deaths per 1,000 live births). The few countries with exceptionally high infant mortality rates also have high fertility; Senegal, for example, had an infant mortality rate of 112 and a total fertility rate of 7.1 about the time of its 1978 survey.

Using data for 15 countries, the U.N. Population Division made what is so far the main analysis of WFS findings to explore the relationship between infant mortality and fertility.[15] This study found that, at the individual level, fertility consistently increased as the number of child deaths increased. While this relationship is partly due to the fact that higher fertility increases the probability of child death (because of the close spacing of births), it is also likely that higher child mortality will cause higher fertility for two reasons: breastfeeding is curtailed when the infant dies, thereby hastening the return of ovulation, and parents may be motivated to replace the dead child.

It has been frequently argued that couples in developing countries are unlikely to reduce their fertility until they can be assured that more of their children will survive. While "child replacement" can explain only part of the correlation between infant mortality and fertility rates observed with WFS data, it is notable that a survey of husbands of WFS respondents in Thailand found that children were still seen as the main source of care and assistance for parents in illness or old age, and that small families were considered more vulnerable to loss of support to parents due to child mortality. This persistence of traditional fears of infant and child mortality is remarkable since infant mortality in Thailand had declined by two-thirds between 1940 and 1970 and in the five years before the 1975 WFS survey was at the moderate level of 65 deaths to infants under age one per 1,000 live births (see Table 3). The U.N. Population Division also found some support for the "replacement" hypothesis in an analysis of Colombian data: women who had had one or more children die were more likely to want another child compared with women who had not experienced a child death.

That the WFS surveys focused on fertility would obtain such high-quality data on infant and child mortality was highly unexpected. In many countries they have provided the first available data on this topic. In others they revealed that existing data, usually from the vital registration system, underestimated the true level of infant mortality. For Sri Lanka, Meegama showed that the availability of toilet facilities was important in explaining the level of infant mortality.[16] The Haitian survey revealed that infant mortality had risen in recent years. This rich, though unexpected, source of data on infant and child mortality will be important for health planning in the WFS countries.

Age at first marriage

To facilitate comparisons among countries with diverse systems of union formation, the WFS developing country surveys defined marriage as any sexual union, whether or not legally recognized.

Thus defined, marriage is virtually universal in most of the developing countries for which WFS results are available, as seen in Table 7 (page 26). In 22 of the 29 countries, 97 percent or more of the women aged 45-49 had been married. The percentages of women of this age who were still single (i.e. never-married) were 5-6 percent in four countries—Mexico, Paraguay, Peru and the Philippines—and 9-10 percent in Colombia and Costa Rica.

An index of current marital patterns is the median age at first marriage—the age at which half of all women are married—for the group of women aged 25-29 at the time of the survey. These medians were generally lowest in Africa and the Caribbean but were lowest in Bangladesh (13.3) and Nepal (15.2) and ranged up to 21 or more in Costa Rica, Korea, Philippines and Sri Lanka (see Table 7). The more typical median age at marriage of 16-19 was found in nine countries, mainly in Africa, Asia and the Caribbean. Twelve countries—including eight in Latin America and the Caribbean—had a median between 19 and 21.

The median age at marriage is rising in Asia. African and Latin American countries show little change. In the Republic of Korea, Malaysia and Sri Lanka, women aged 25-29 at the time of the survey had married on average four or more years later than women aged 45-49 (see Table 7). Median age at marriage appeared to decline in seven countries, but part of this is due to older women's tendency to overstate their age at entering first marriage or union because they fail to take into account their earliest, probably nonlegalized, unions. The largest declines in median age at marriage were found in three Caribbean islands—the Dominican Republic, Haiti and Jamaica—where nonlegalized unions are common, especially as the first union.

Several countries have a high rate of teenage marriage. In Bangladesh, Nepal and Senegal, more than half of the women aged 15-19 were married (see Table 7). However, in 16 of the 29 countries, fewer than 20 percent of the women in this age group were married. This suggests that the incidence of teenage marriage is declining in many developing countries.

However, the data in Table 7 also suggest that most women in developing countries begin married life relatively early; in 15 of the 29 countries, fewer than 12 percent of the women aged 25-29 had never married. Marriage is especially delayed (20 to 32 percent still single in this age group) in only five countries—Colombia, Costa Rica, Peru, Philippines and Sri Lanka. (In the United States in 1978, about the time of these WFS surveys, 18 percent of women aged 25-29 had never been legally married.[17])

Marital patterns and fertility

Theoretically, women who marry later spend fewer fertile years exposed to the risk of pregnancy and thus could be ex-

Table 7. Age at Marriage and Time Spent in Marriage Since Age 14

Region and country	Percent single[a] in current age group			Median age at marriage of women in current age group			Median age at marriage, all women	Percent of time spent in marriage since age 14[b]
	15-19	25-29	45-49	25-29	45-49	Difference		
Africa								
Kenya	72.4	4.3	0.3	18.0	18.4	−0.4	18.3	81
Lesotho	68.5	7.2	2.7	18.9	18.3	+0.6	18.7	75
Senegal	40.7	4.4	0.4	16.3	16.1	+0.2	16.0	87
Sudan (North)	77.5	10.2	1.0	—	—	—	—	84
Asia and Pacific								
Bangladesh	29.3	1.0	0.0	13.1	12.4	+0.7	13.3	97
Fiji	87.8	10.3	1.0	19.5	17.8	+1.7	19.5	83
Indonesia	62.6	5.1	0.7	16.1	15.6	+0.5	16.6	83
Korea, Rep. of	97.4	10.5	0.3	22.8	17.1	+5.7	21.2	80
Malaysia	88.7	17.4	0.5	20.9	16.9	+4.0	19.0	80
Nepal	41.0	2.1	0.7	15.2	15.8	−0.6	15.7	86
Pakistan	61.8	8.5	0.8	16.5	15.3	+1.2	16.3	90
Philippines	93.2	29.3	5.6	21.8	20.5	+1.3	21.6	76
Sri Lanka	93.2	31.9	2.1	23.0	18.2	+4.8	21.7	78
Thailand	83.7	19.1	3.3	20.4	19.8	+0.6	20.3	76
Latin America and Caribbean								
Colombia	84.9	22.3	9.1	20.7	20.9	−0.2	20.8	69
Costa Rica	85.4	25.0	9.6	21.7	21.8	−0.1	21.4	70
Dominican Rep.	72.1	9.7	3.0	17.9	18.8	−0.9	18.5	73
Guyana	72.2	7.2	2.0	18.4	17.9	+0.5	18.4	78
Haiti	83.7	14.2	2.4	19.8	21.0	−1.2	20.2	68
Jamaica	72.6	4.2	1.5	17.8	20.2	−2.4	18.4	68
Mexico	80.8	16.6	5.1	20.1	20.0	+0.1	20.1	76
Panama	80.3	11.1	1.9	19.9	18.9	+1.0	19.7	72
Paraguay	83.1	19.3	5.2	20.6	20.3	+0.3	20.6	72
Peru	86.0	23.2	5.6	20.6	20.3	+0.3	20.7	73
Trin. & Tob.	80.3	9.9	2.2	19.2	17.8	+1.4	19.0	79
Venezuela	79.9	18.0	—[c]	19.9	18.9	+1.0	20.0	73
Middle East								
Jordan	81.0	13.0	1.8	18.3	16.7	+1.6	18.4	86
Syria	77.3	17.4	1.8	19.3	18.7	+0.6	19.4	80
Turkey[d]	84.3	7.5	0.7	—	—	—	—	—

Sources: David P. Smith, "Age at First Marriage," *WFS Comparative Studies*, No. 7, 1980; and WFS data tapes.

[a]Never-married. [b]Ever-married women aged 40-49.

[c]Women aged 45-49 not interviewed. Age group 40-44 used instead of age 45-49 in estimating change in median age at marriage.

[d]Only data available in *Country Report*, Vol. 1, are shown.

pected to have fewer children than women marrying earlier in countries where contraceptive use is not widespread. However, one of the unexpected findings of the WFS developing country surveys is that women who marry later do not necessarily have fewer children than women who marry early. Comparing completed family size among ever-married women aged 45-49, the average number of children ever born per woman does not uniformly decline among women marrying at later ages, nor is there a similar effect among the 29

Table 8. Children Ever Born by Age at First Marriage

(Mean number of children ever born to ever-married women aged 45-49 at time of interview, by age at first marriage)

Region and country	Mean age at first marriage	Children ever born	Number of children by age at first marriage					
			<15	15-17	18-19	20-21	22-24	25+
Africa								
Kenya	18.4	7.9	7.9	8.4	8.1	7.4	7.6	6.5
Lesotho	18.1	5.4	5.5	5.7	5.6	5.1	4.8	2.8
Senegal	16.4	7.2	6.9	7.4	7.9	5.6	*	*
Sudan (North)	16.8	6.0	6.5	5.6	6.2	6.0	7.3	4.5
Asia and Pacific								
Bangladesh	11.6	6.8	6.8	7.0	*	*	*	*
Fiji	17.9	6.6	7.7	7.3	6.6	5.5	5.3	4.8
Indonesia	16.4	5.3	5.5	5.5	5.1	5.2	4.8	3.7
Korea, Rep. of	17.0	5.8	6.9	6.2	5.2	4.4	4.1	3.5
Malaysia	17.0	6.2	5.8	6.8	6.8	6.2	5.8	3.8
Nepal	16.0	5.7	6.0	5.6	6.1	5.5	5.0	4.6
Pakistan	15.3	6.9	6.9	7.3	6.3	6.8	*	*
Philippines	20.7	7.0	8.8	8.7	7.5	7.3	6.2	4.2
Sri Lanka	19.0	6.1	7.3	7.1	6.3	6.1	5.0	3.5
Thailand	19.7	6.7	6.6	7.6	7.5	6.3	6.2	3.8
Latin America and Caribbean								
Colombia	20.9	7.3	9.9	8.2	8.3	8.1	6.3	4.6
Costa Rica	21.8	7.2	*	9.2	8.0	8.2	6.4	4.8
Dominican Rep.	18.8	6.7	7.9	7.4	7.3	7.0	4.7	4.0
Guyana	18.2	6.5	7.5	7.0	7.1	6.2	4.9	3.7
Haiti	21.1	6.0	*	6.8	6.8	6.5	6.1	4.3
Jamaica	20.4	5.6	7.0	6.3	6.8	5.0	5.4	3.7
Mexico	19.4	7.1	8.0	8.3	7.9	6.5	6.1	4.2
Panama[a]	19.3	5.9	7.5	7.3	5.7	5.2	5.0	3.2
Paraguay	20.7	6.5	7.0	8.7	7.4	6.2	5.1	3.9
Peru	20.3	7.1	9.1	8.5	7.2	7.0	6.3	4.3
Trin. & Tob.	18.2	5.9	7.8	7.0	5.4	4.6	4.3	2.9
Venezuela[a]	19.5	6.3	8.1	7.7	6.2	6.4	5.1	3.0
Middle East								
Jordan	16.7	8.9	10.4	8.8	8.2	8.0	6.8	5.7
Syria	19.1	7.8	8.7	8.5	8.7	7.6	7.8	4.6
Turkey	17.6	6.3	7.5	7.0	5.9	5.5	4.6	3.5

Sources: Format based on John C. Caldwell, Peter F. McDonald, and Lado T. Ruzicka, "Interrelations Between Nuptiality and Fertility: The Evidence from the World Fertility Survey," paper presented at the WFS Conference, London, July 1980, Table 10. Some data from this source; others from WFS data tapes.

[a]Age group 40-44, since 45-49 group not interviewed. *Less than 10 cases.

countries, as seen in Table 8. In Costa Rica, women aged 45-49 had an average of 7.2 children despite having the highest median age at marriage (21.8) among this age group in the 29 countries surveyed, while women this age in Bangladesh had the lowest median age at marriage (11.6) but had averaged fewer children—6.8.

Overall, an increase in age at first marriage from 15 to about 20 does not appear to have a significant or consistent effect on completed fertility. One reason for this is that teenagers are generally subfecund and may not become pregnant as easily as women in their twenties. They are also more likely to suffer miscarriages and complications during delivery which both reduces their chances of producing a live birth at the time and increases the chances of infection which can reduce their fertility in

later years. Postponing marriage until the later teens may actually contribute to increased fertility due to improved pregnancy outcome. Another factor to consider is that women marrying at the age of 20 still have another 20-25 years of reproductive life remaining and can still have a large number of children.

The delay of marriage to age 20-21 is associated with lower fertility in about half of the countries, but in the others fertility is almost the same or higher than it is for those marrying under age 20. However, marriage at age 22 or later is associated with lower fertility in most countries, although even those who married above age 25 had 4-5 children in many cases (see Table 8). The phenomenon of women who marry later having their children in quick succession has been called the "catching up effect" and has been observed even in populations where contraceptive use is low and "natural" fertility prevails.[18] In countries where contraception is generally practiced, the differences in completed family size among women married at various ages are reduced, though not entirely eliminated. Compared with women who marry before the age of 20-21, women who marry later are likely to have more children in the first five years of marriage.

Women who marry late are generally different from the rest of the population in several important respects: they are usually of a higher social status, better educated, and more likely to live in urban areas. They also have higher rates of contraceptive use, which may partly explain their somewhat lower level of completed fertility, rather than the fact that they are exposed to the risk of pregnancy for fewer years than women who marry younger.

These findings have two major implications for public policy: (1) a simplistic policy measure raising the age at marriage, even if enforceable, will not greatly affect fertility if all other socioeconomic characteristics of women remain the same; and (2) substantial increases in the age at marriage, to an average level of 25 years of age or more, will be necessary if this factor alone is to have an effect on achieved fertility.

Marital stability and fertility

The effects of early marriage on fertility can be offset by a high incidence of marital dissolution, since this would tend to increase the time women spend outside of marital unions. Marriages were generally stable in the developing countries with completed WFS surveys. This is suggested by the fact that in 19 of 28 countries (data are not available for Turkey), ever-married women aged 40-49 had had an average of only 1.2 or fewer partners—equivalent to 80 percent of more of these women having only one partner. The average ranged from 1.3 to 1.9 partners in the other nine countries, of which seven are in Latin America and the Caribbean.

Because of remarriage, women who had had more than one partner had not spent as much time outside of marriage as might be expected. However, in general, fertility declined as the number of partners rose or the percent of time spent in union since first marriage declined. But these findings are affected by the Latin American and Caribbean countries, where "marital" dissolution has always been common and fertility is now lower than in other countries, and therefore they may not reflect a true causal relationship between marital dissolution and fertility.

An alternate measure of marital patterns is the percent of time ever-married women aged 40-49 had spent in union since age 14, which reflects age at marriage as well as marital dissolution. These figures ranged from a low of 68 percent in Haiti and Jamaica to 97 percent in Bangladesh (see last column, Table 7, page 26). The correlation between this measure and fertility at the country level was not statistically significant. Thus, on the whole, the WFS data do not indicate any strong or consistent

relationship between marital instability and fertility.

Breastfeeding and fertility

By delaying the return of ovulation and thus extending the period of natural infertility after a birth, breastfeeding is an important determinant of the length of intervals between births and, therefore, of fertility. Postpartum sexual abstinence may further lengthen the period between births in some cultures. The effect of breastfeeding on fertility depends on how long, frequently and exclusively infants are breastfed. Ovulation returns sooner if supplemental foods are used and, for this reason, most women experience a return of fertility after about one year even in countries where breastfeeding averages two years.[19]

WFS surveys provide the first large body of uniform data on the level and differentials of breastfeeding for representative national samples. The major finding is that the vast majority of women in the countries surveyed breastfeed their children. Except for Fiji, Malaysia and Philippines, 92 to 98 percent of women in Africa, Asia and the Middle East had breastfed their children (see Table 9). The proportions were smaller in Latin America and the Caribbean—74 to 97 percent. The median duration of breastfeeding was also shorter in Latin America and the Caribbean, ranging from 2 to 7 months, except in Haiti (15 months), Paraguay (12 months), and Peru (13 months), compared to 13 to 25 months in Africa and Asia, except for Malaysia (2.6 months).

WFS data indicate that breastfeeding is declining in developing countries. Older women had breastfed for 2 to 3 months longer than younger women in most countries, and by as much as 5 months longer in Indonesia. Rural women had breastfed for 2-10 months longer than urban women, on the average. This difference is particularly striking in the Dominican Republic and Panama (6 months), in Haiti, Peru and Philippines (7 months), and in Indonesia (10 months).[20] The duration of breastfeeding also decreases as education rises: women with no education breastfeed for 3-5 months longer on average than women who have attended primary school, and women with 4-6 years of education breastfeed 2-4 months longer than women with more education. In addition, women employed outside the home usually breastfeed 2-5 months less than women working at home or not working

Table 9. Amount and Duration of Breastfeeding

Region and country	Percent of women who had ever breastfed	Median length of breast-feeding (months)
Africa		
Kenya	98	15.4
Lesotho	96	20.5
Senegal	98	19.1
Sudan (North)	98	14.5
Asia and Pacific		
Bangladesh	98	30.7
Fiji	86	9.2
Indonesia	97	22.2
Korea, Rep. of	93	16.6
Malaysia	73	2.6
Nepal	98	23.6
Pakistan	95	19.2
Philippines	86	12.7
Sri Lanka	95	20.8
Thailand	92	18.9
Latin America and Caribbean		
Colombia	90	6.8
Costa Rica	74	1.8
Dominican Rep.	89	7.2
Guyana	88	4.5
Haiti	97	15.0
Jamaica	92	6.0
Mexico	80	6.7
Panama	79	3.7
Paraguay	92	11.8
Peru	93	12.9
Trin. & Tob.	80	6.3
Venezuela	82	3.0
Middle East		
Jordan	92	8.5
Syria	96	9.2

Source: Benoit Ferry and David Smith, "Breast-feeding Differentials," *WFS Comparative Studies*, forthcoming 1982.

Note: Data are not available for Turkey.

at all. If current increases in urbanization, female education, and female labor force participation continue, it is likely that the practice of breastfeeding will decline further.

One interesting finding based on WFS data is that women in developing countries do not appear to be using breastfeeding deliberately to space pregnancies. Population Council demographers Anrudh Jain and John Bongaarts found that women who had had more births were not more likely to breastfeed than women with fewer children, even when age, education, place of residence, women's workplace and husband's occupation were controlled.[21]

Regardless of the woman's intent, however, breastfeeding clearly has a substantial effect on the spacing between births and on total fertility. Jain and Bongaarts found that one month of breastfeeding added 0.7 months to the length of the birth interval in Sri Lanka, 0.5 months in Colombia, Indonesia and Panama, 0.4 months in Bangladesh and Peru, and 0.3 months in Guyana and Jordan. These figures may be understated because WFS respondents partly offset the contraceptive effect of breastfeeding by using supplementary foods. Other studies have shown than one month of breastfeeding lengthened the birth interval by 0.75 months.

Two studies of WFS data showed that postpartum infertility due to breastfeeding was already so short among literate, urban women in Latin America and in Malaysia, Philippines and Jordan that any increase in contraceptive use would be translated into declines in marital fertility.[22] However, among illiterate, rural Latin American women and in most Asian and African countries, much of the current restraint on fertility comes from the traditionally long periods of breastfeeding, combined with postpartum abstinence in some cases. Thus declines in breastfeeding may neutralize the effect of increasing contraception on marital fertility if the increase is too slow. The authors of these studies predict a rise in marital fertility in such countries as Bangladesh, Kenya and Pakistan if the reduction in breastfeeding under way in most countries gains momentum and no contraceptive revolution occurs.

The socioeconomic changes that influence declines in breastfeeding probably also encourage contraceptive use. The question is whether contraceptive use can replace breastfeeding rapidly enough to forestall an increase in fertility.

Contraceptive awareness

Since WFS respondents were only asked whether they had "heard" of various contraceptive methods, the surveys provide information on contraceptive "awareness," rather than the extent to which women actually know how to use specific methods. Respondents were asked to recall all the methods for avoiding childbearing they had heard of. After noting these "spontaneously mentioned" methods, the interviewer read short descriptions of other methods and asked whether the respondent had heard of them. Contraceptive awareness includes both the methods mentioned spontaneously and those recognized from the interviewer's "probe."

Only four countries—Lesotho, Senegal, Sudan (North) and Nepal—had large proportions of women (34 to 77 percent) who had not heard of a single contraceptive method, as seen in Table 10. The percentage ranged from 10 to 18 percent in six more countries—Bangladesh, Haiti, Indonesia, Peru, Syria and Turkey. The Pakistan figure of 24 percent overstates lack of awareness, since it is based only on methods mentioned spontaneously, without further probing. In the remaining 18 countries, fewer than 10 percent of respondents were unaware of all methods.

Among respondents who had heard of at least one contraceptive method, the overwhelming majority in all countries except Senegal mentioned at least one efficient or modern contraceptive meth-

Table 10. Contraceptive Awareness Among Currently Married, Fecund Women

Region and country	Unaware of any method (percent)	Aware only of inefficient methods (percent)	Aware of 1 or more efficient methods (percent)
Africa			
Kenya	9	3	88
Lesotho	34	5	61
Senegal	40	40	20
Sudan (North)	49	1	50
Asia and Pacific			
Bangladesh	16	3	81
Fiji	0	0	100
Indonesia	18	1	81
Korea, Rep. of	1	0	99
Malaysia	6	2	92
Nepal	77	1	22
Pakistan[a]	24	1	76
Philippines	5	0	95
Sri Lanka	7	1	92
Thailand	3	0	97
Latin America and Caribbean			
Colombia	4	1	95
Costa Rica	0	0	100
Dominican Rep.	2	0	100
Guyana	4	0	96
Haiti	15	3	82
Jamaica	1	0	99
Mexico	9	0	90
Panama	1	0	99
Paraguay	4	1	95
Peru	17	4	79
Trin. & Tob.	1	0	99
Venezuela	2	0	98
Middle East			
Jordan	3	0	97
Syria	10	0	90
Turkey	10	2	88

[a]Pakistan data are based on spontaneous mentions. Other data also include responses to interviewer "probes."

Note: "Efficient" (modern) contraceptive methods include: pill, IUD, condom, injectables, female and male sterilization, and "other female scientific methods" (foam, jelly, suppositories, cervical caps, diaphragm). "Inefficient" (traditional) methods include: douche, rhythm, withdrawal, abstinence, and "country specific methods" (e.g., charms, abdominal massage, herbal medicines, urination after intercourse).

od (i.e. oral contraceptives, IUD, condom, injectables, female and male sterilization, and female barrier methods such as the diaphragm). In Senegal, 40 percent of respondents were aware of at least one inefficient or traditional method (i.e. douche, rhythm, withdrawal, abstinence and folk methods), but only 20 percent had heard of any efficient methods (see Table 10).

Contraceptive use

As with contraceptive awareness, the data on contraceptive use presented here relate to women who are currently married and "fecund," i.e. able to bear children. This category excludes women who report that they are sterile but includes women who themselves, or whose husbands, have been sterilized for contraceptive purposes. Across the 29 countries, about one-third (32 percent) of such women, or their husbands, were using some form of contraception at the time of interview.

Contraceptive use ranged from 3 percent in Nepal to 71 percent in Costa Rica (see Table 11). The figure is highest in Latin America and the Caribbean, where the average is 44 percent (weighting each country equally), with proportions of 40 percent and more in seven countries and 20 to 39 percent in the other five. In Asia and the Pacific—with a regional average of 28 percent—the proportions vary from 46 percent in Fiji and 40 percent in Thailand down to 10 percent or lower in Bangladesh, Nepal and Pakistan. The three Middle Eastern countries have moderate proportions of between 23 and 45 percent, while the four African countries have low proportions of just 4 to 8 percent.

Developed countries typically have much higher levels of contraceptive use. Among the 16 developed countries for which comparable data are available from WFS-type surveys, contraceptive use was below 60 percent in only three countries—Spain, Yugoslavia and Romania—and the overall average was 72 percent (see Table 11). Finland, Belgium and Czechoslovakia had proportions between 80 and 95 percent, while the figures were between 63 percent and 78 percent in the remaining ten countries.

Table 11. Current Contraceptive Use: Developing and

(Percent of currently married, fecund women using contraception at time of survey)

Range	Africa	Asia & Pacific	Latin Am. & Caribbean	Middle East
0-10%	Senegal-4 Sudan (North)-5 Lesotho-7 Kenya-8	Nepal-3 Pakistan-7 Bangladesh-10		
20-39%		Indonesia-33 Korea, Rep.-35 Sri Lanka-35 Malaysia-36 Philippines-39	Haiti-20 Mexico-35 Guyana-35 Dominican Rep.-36 Peru-36	Syria-23 Jordan-29
40-59%		Thailand-40 Fiji-46	Paraguay-41 Jamaica-44 Colombia-46 Venezuela-52[a] Trin. & Tob.-56 Panama-58[b]	Turkey-45
60-79%			Costa Rica-71[b]	
80-100%				
Regional average[c]	6%	28%	44%	32%

Sources: WFS *Country Reports*, Vol. 1; and Jerzy Berent, "Family Planning in Europe and USA in the 1970's," *WFS Comparative Studies: ECE Analyses of WFS Surveys in Europe and USA*, Table 1, forthcoming 1982.

[a]Women aged 15-44. [b]Women aged 20-49.

[c]Regional averages weight each country equally.

These figures are for women still married to their first husbands and under age 45 (rather than 15-49).

Contraceptive use patterns also differ substantially by age between developing and developed countries. For example, in the United States at the time of its 1976 WFS-type survey, 77 percent of women who were fecund and currently married (whether or not to their first husbands) were using contraception. This was nearly two and a half times the 32 percent average for the 29 developing countries for which WFS data are available. However, U.S. married women aged 15-19 in 1976 were five times more likely to use contraception than their counterparts in developing countries, as seen in Figure 1. By ages 35-39, U.S. married women are only twice as likely to use contraception as women of that age in developing countries.

Contraceptive use in developing coun-

Developed Countries

Europe and United States

Spain (1977)-51
Yugoslavia (1976)-58
Romania (1978)-58

Denmark (1975)-63
United States (1976)-70
France (1977)-71
Norway (1977)-71
Hungary (1977)-74
Netherlands (1975)-[illegible]
Poland (1977)-75
Bulgaria (1976)-76
England & Wales (1976)-77
Italy (1979)-78

Finland (1977)-80
Belgium (1975)-85
Czechoslovakia (1977)-95

72%

Note: Data for developing countries are for all currently married, fecund women aged 15-49 and are age-standardized. Data for developed countries are for fecund women under age 45 (under 40 in Hungary), currently married to first husband.

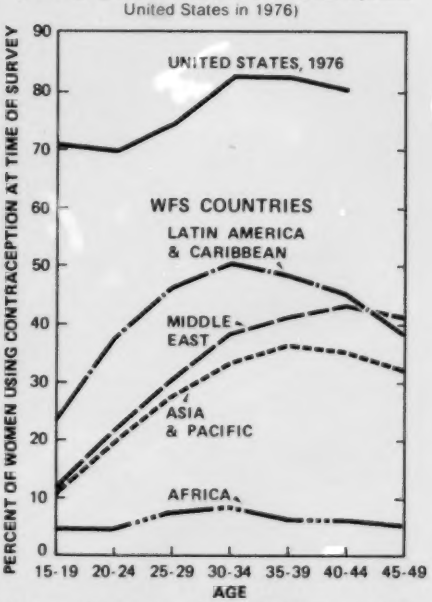
tries is comparatively low among women under age 30 and rises substantially after that, whereas in the United States it is relatively even among all married women aged 15-44. This suggests that women in developing countries are more likely to adopt contraception when they have had all the children they want (although a third of contraceptors in WFS surveys were using contraception to space births, as noted later), while women in the United States and other developed countries rely on contraception to postpone the first birth and space between births, as well as for stopping childbearing altogether.

Methods used. Despite widespread awareness of efficient, modern contraceptive methods, 31 percent of the women using contraception at the time of interview in the 29 developing countries were using inefficient or traditional methods (see last column, Table 12).*

*WFS categorizes contraceptive methods as "efficient" or "inefficient." See bottom of Table 10 for listing. Other terms often used are "modern/traditional" and "effective/ineffective."

Figure 1. Age Patterns of Contraceptive Use Among Currently Married, Fecund Women

(Developing countries at time of WFS surveys and United States in 1976)



Sources: WFS data from *First Country Reports* and data tapes for 29 developing countries; and William D. Mosher, *Contraceptive Utilization, United States, 1976*, Vital and Health Statistics: Data from the National Survey of Family Growth, Series 23, No. 7 (Hyattsville, Md.: National Center for Health Statistics, March 1981) Table 3.

Table 12. Methods of Contraception Currently Used: Developing and Developed Countries

(Percentage distribution, by method, of contraceptive use at time of survey)

Region and country	Pill	IUD	Diaphragm, foam, etc.	Douche	Condom	Rhythm	Withdrawal	Abstinence	Female sterilization	Male sterilization	Other methods	Injectables	Percent using inefficient methods[a]
						Developing countries							
Africa													
Kenya	30	10	0	0	2	16	2	16	13	1	1	8	35
Lesotho	24	3	1	0	3	2	49	0	16	0	0	4	51
Senegal	8	4	0	1	2	10	0	67	1	0	8	0	86
Sudan (North)	67	2	2	0	3	10	2	2	6	1	0	3	14
Regional average	32	5	1	0	3	10	13	21	9	1	2	4	46
Asia and Pacific													
Bangladesh	36	5	1	1	10	13	7	15	4	6	3	0	39
Fiji	20	12	0	0	15	6	7	1	39	0	1	1	15
Indonesia	57	21	0	0	7	3	1	4	1	0	5	1	13
Korea, Rep. of	24	23	1	1	15	13	7	1	5	10	0	1	22
Malaysia	49	2	0	0	8	11	6	5	11	1	7	1	29
Nepal	16	2	0	0	9	0	0	2	3	67	0	0	2
Pakistan	18	12	3	0	19	2	2	22	18	1	2	0	28
Philippines	13	7	0	0	10	24	26	5	13	2	0	0	55
Sri Lanka	5	15	0	0	7	25	5	11	29	2	0	1	41
Thailand	41	18	0	0	1	3	3	2	19	6	1	6	9
Regional average	28	12	1	0	10	10	6	7	14	10	2	1	25
Latin America and Caribbean													
Colombia	31	20	6	1	4	12	11	2	9	0	2	1	28
Costa Rica	35	8	3	1	14	8	7	1	19	2	1	3	18
Dominican Rep.	25	9	5	2	5	4	12	0	38	0	1	1	19
Guyana	29	18	6	0	9	3	4	2	27	0	1	1	10
Haiti	18	3	1	3	6	22	25	21	1	1	1	0	72
Jamaica	31	5	4	0	17	1	4	1	21	0	0	16	6

Mexico	36	19	5	1	3	10	12	0	9	1	1	6	24
Panama	32	7	0	3	0	1	2	5	6	3	3	38	14
Paraguay	33	15	2	5	4	12	7	0	6	0	12	5	36
Peru	13	4	3	11	3	35	11	7	9	0	2	3	66
Trin. & Tob.	35	4	10	1	29	5	6	1	8	0	0	2	13
Venezuela	31	17	2	5	10	8	10	0	16	0	1	0	24
Regional average	29	11	4	3	9	10	9	3	14	1	2	6	27
Middle East													
Jordan	47	8	1	0	6	8	13	2	7	0	6	2	29
Syria	60	3	7	1	3	14	8	0	2	0	1	2	24
Turkey	16	8	1	11	8	3	44	0	1	0	7	1	65
Regional average	41	6	3	4	6	8	22	1	3	0	5	2	40
Total average	30	10	2	2	8	10	10	7	13	4	2	4	31
						Developed countries							
Europe and United States													
Belgium	38	4	1	—	8	15	27	—	6	—	—	—	45
Bulgaria	3	2	—	—	3	5	79	7	1	1	1	—	92
Czechoslovakia	15	19	1	—	14	7	31	1	3	—	9	—	48
Denmark	35	14	7	—	39	1	2	—	—	—	3	—	61
Finland	14	36	1	—	40	1	3	—	5	1	—	—	4
France	34	13	2	—	8	9	29	—	5	—	—	—	38
Great Britain	36	9	3	—	23	1	6	—	10	11	—	—	7
Hungary	49	13	2	—	5	5	23	—	2	—	1	—	29
Italy	18	3	3	—	17	11	46	—	1	—	1	—	58
Netherlands	66	6	1	—	14	4	3	—	3	3	1	—	8
Norway	28	39	3	—	23	4	5	—	6	3	—	—	9
Poland	10	2	4	—	19	41	25	—	—	—	—	—	66
Romania	1	—	2	—	6	41	44	—	—	—	6	—	91
Spain	26	1	2	—	10	12	44	3	—	—	2	—	58
United States	34	9	10	—	11	5	3	—	12	13	2	—	10
Yugoslavia	9	3	6	—	4	6	65	—	—	—	5	—	78

Sources: *First Country Reports*; unpublished tables; Berent, "Family Planning in Europe and USA," Table 6.

[a]Douche, rhythm, withdrawal, abstinence, "other methods."

Note: Regional and total averages weight each country equally.

The proportion of contraceptors using inefficient methods was highest in the African and Middle East countries (46 percent and 40 percent, respectively) and lowest in the Asia-Pacific and Latin America-Caribbean countries (25 and 27 percent, respectively). The figure exceeded 40 percent in seven countries—Haiti, Lesotho, Peru, Philippines, Senegal, Sri Lanka and Turkey. Since inefficient methods are generally more difficult to use, their use seems to indicate a strong commitment to postpone or stop childbearing as well as either lack of access to efficient methods or religious beliefs opposed to use of such methods.

Giving each of the 29 countries equal weight, 73 percent of all contraceptive use is accounted for by five methods, led by the pill (30 percent), followed by female sterilization (13 percent), with rhythm, the IUD and withdrawal tied in third place with 10 percent each (see total for developing countries, Table 12). The remaining 27 percent of current contraceptive use includes the condom (8 percent), abstinence (7 percent), injectables (4 percent), male sterilization (4 percent), female barrier methods such as the diaphragm and foam (2 percent), douche (2 percent), and "other methods" (2 percent), which include folk methods such as herbal medicines, uterine massage, and such practices as urination after intercourse.

The methods used vary widely from country to country. For example, the pill is used by only 5 percent of all contraceptors in Sri Lanka, compared with 55-67 percent in Indonesia, Sudan (North) and Syria. Female sterilization accounts for only 1 percent of contraceptive use in Haiti, Indonesia, Senegal and Turkey, compared with 27-39 percent in the Dominican Republic, Fiji, Guyana and Sri Lanka.

Withdrawal is used by less than 1 percent of contraceptors in Nepal and Senegal, but by 25 to 49 percent of contracepting couples in Haiti, Lesotho, Philippines and Turkey. Abstinence, used by 2 percent or fewer of the contraceptors in 18 of the 29 developing countries, is used by 67 percent of all users in Senegal and 15-22 percent in Bangladesh, Haiti, Kenya and Pakistan.

Male sterilization, which accounts for 6 percent or less of all current use in 27 countries, is used by 67 percent of contraceptors in Nepal and 10 percent in the Republic of Korea. Condom use is below 10 percent in 21 of the 29 developing countries but assumes major importance in Trinidad and Tobago (29 percent of all users) and in Fiji, Korea, Jamaica and Pakistan (15-19 percent). Use of injectables averages 4 percent across all countries, but injectables are more widely used than the pill in Panama (39 percent compared with 32 percent).

Turning to the 16 developed countries that have had recent WFS-type surveys, striking differences in contraceptive practice were found. Use of efficient contraceptive methods ranges from 9 percent of all current users in Romania to 96 percent in Finland, as evident from the last column of Table 12, bottom panel. The pill was the most popular method in Belgium, France, Great Britain, Hungary, the Netherlands and the United States. The IUD ranked first in Norway (39 percent of all contraceptive use) and was also popular in Finland (36 percent), where the condom ranked first (40 percent), as it did in Denmark (39 percent). Female and male sterilization for contraceptive purposes was of little importance in these 16 countries at the time of their surveys, with the major exceptions of Great Britain (21 percent of current use) and the United States (25 percent). Inefficient methods account for 48 percent or more of current contraceptive use in Bulgaria, Czechoslovakia, Italy, Poland, Romania, Spain and Yugoslavia. This is mainly withdrawal, except in Poland, where rhythm ranks first (41 percent of all use), and in Romania, where rhythm (41 percent) is almost as popular as withdrawal (44 percent). In analyzing

these data, Economic Commission for Europe demographer Jerzy Berent notes that induced abortion is "still obviously the main method of birth control" in Bulgaria and Romania, and remains important in other East European countries, including even Hungary, where the pill is now the most popular contraceptive method.[23]

Contraceptive availability and use

A key issue for policymakers wanting to influence fertility trends is the extent to which contraceptive use is affected by the availability of family planning services. Some answers are now available from data on current contraceptive use and questions asked in 12 WFS surveys about respondents' knowledge of sources of family planning supplies. These questions measured only perceived availability, however. It is likely that couples who are highly motivated to limit their fertility will seek out family planning services wherever they are, while those who are less motivated will not make such an effort. More objective data on the availability of services in specific areas are needed and were, in fact, collected for some WFS surveys that interviewed local officials, using the "community-level variables" module. The one study of such data completed to date, for rural areas in Bangladesh, the Republic of Korea and Mexico, found that contraceptive use was higher in communities with better availability of services.[24] This is in line with the general conclusions to be drawn from findings based on women's responses, described in this section.

Among the 12 developing countries for which data are available, knowledge,

Table 13. Knowledge of Family Planning Outlets and Contraceptive Use by Residence and Travel Time to Outlet

(Numbers in percentages of currently married women)

Region and country	Know outlet	Know family planning outlet							Do not know outlet
		Using contraception	Travel time to outlet						
			Less than 30 min. Using contraception			30 minutes or more Using contraception			Using contraception
			Total	Urban	Rural	Total	Urban	Rural	
Africa									
Kenya	42	13	16	22	12	12	22	12	2
Lesotho	27	13	—	—	—	—	—	—	3
Asia									
Indonesia	54	46	—	—	—	—	—	—	7
Korea, Rep. of	86	39	41	44	37	37	39	36	9
Malaysia	77	39	42	51	36	35	47	32	11
Philippines	77	44	47	52	43	36	52	35	10
Latin America and Caribbean									
Colombia	66	55	57	58	50	51	58	45	18
Mexico	49	50	52	55	38	49	56	34	11
Panama	72	60	—	—	—	—	—	—	38
Paraguay[a]	91	40	47	52	37	30	43	27	5
Trin. & Tob.	92	55	—	—	—	—	—	—	12
Venezuela	68	57	59	60	45	53	57	43	33

Sources: WFS country tapes for Lesotho, Paraguay, Trinidad and Tobago, and Venezuela; all other countries from James W. Brackett, "The Role of Family Planning Availability and Accessibility in Family Planning Use in Developing Countries," paper presented at the WFS Conference, London, July 1980.

[a]Travel time to outlets was asked only of women who knew the pill, IUD, condom or sterilization and a source for one or more of these methods.

of a family planning "outlet" ranged as high as 91-92 percent in Paraguay and Trinidad and Tobago and 86 percent in the Republic of Korea (see Table 13), and was well over 50 percent in most other countries. Mexico's figure was 49 percent and Kenya's was 42 percent—a low level compared with the non-African countries but still appreciably higher than Lesotho's 27 percent.

As one might expect, women who knew a family planning outlet were more likely to be using contraception, as shown in Table 13. Nevertheless, contraceptive use was far from negligible in several countries among women who knew no outlet. Most of these women were using modern contraceptive methods which suggests that women who had obtained contraceptives from private physicians or who had had a sterilization in a hospital may not have mentioned these as sources.

In an analysis of WFS data for nine countries, James Brackett found that in eight countries, half or more of the women who knew of a family planning outlet lived within less than 30 minutes' travel time from the outlet, but only one-fifth of such women in Kenya.[25] Brackett points out that travel time is only one of many factors involved in the decision-making of a prospective family planning user. The mode and cost of transportation, the cost of child care as well as of contraceptive supplies, and the hours of service and adequacy of supplies at the family planning outlet may also be important considerations.

Travel time does make some difference in contraceptive use: the level was generally 5-10 percent higher among women who knew of an outlet less than 30 minutes away, compared with women who had to travel 30 minutes or more (see Table 13). Some of this difference is due to lower contraceptive use and longer travel time in rural areas compared with urban areas. Within urban areas, longer travel time results in slightly lower contraceptive use in Republic of Korea, Malaysia, Paraguay and Venezuela, while in rural areas the same holds true in Colombia, Malaysia, Mexico, Paraguay and Philippines. The small size of these differences and the fact that they do not occur in all countries support the argument that motivation is generally a stronger determinant of contraceptive use than availability of services. This assertion is supported by two studies of WFS data by Germán Rodriguez and by V.C. Chidambaram and L.V.T. Mastropoalo.[26]

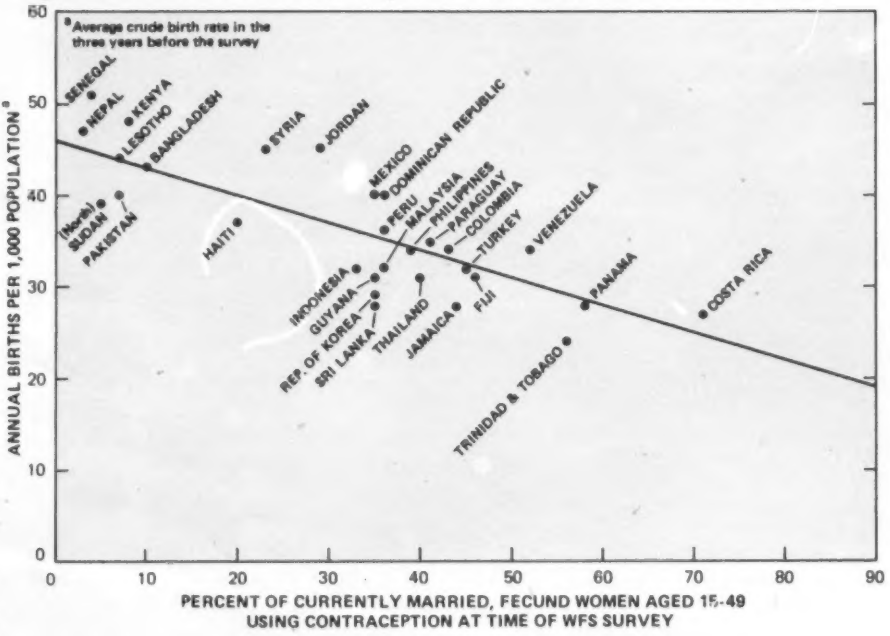
However, when accessibility is related to use of specific methods, a stronger association emerges. Using data from the Philippines, Chidambaram and Mastropoalo found that accessibility was particularly important in relation to methods needing a regular source of supplies, such as the pill and the condom, although it was unrelated to use of sterilization and the IUD—methods not requiring a regular supply source. Rural women were even more likely to use the pill or the condom than urban women if they lived near a source of supplies, and even IUD use was higher among rural women who knew a family planning outlet. The association between accessibility and visits to outlets and possession of contraceptives in the home was also notable in rural areas.

The general conclusion to be drawn from these findings is that contraceptive use would increase in developing countries, especially in rural areas, if more convenient family planning services were available.

Contraceptive use and fertility

The WFS data now available for 29 countries indicate that contraceptive use is closely associated with fertility declines in developing countries; countries with higher levels of contraceptive use consistently have lower crude birth rates than those with lower levels (see Figure 2). Regression analysis indicates that a 3 percent increase in contraceptive use is associated with a one point decline in the crude birth rate (i.e. 1

Figure 2. Current Contraceptive Use and Crude Birth Rates



birth per 1,000 population). According to this analysis, to lower the birth rate by one point would take a 2.4 percent increase in contraceptive use if efficient methods are used and a 3.3 percent increase if inefficient methods are used (controlling for the effects of breastfeeding and marital status).

Contraceptive use and level of development

Increases in gross national product (GNP) per capita, education, and the proportion of people living in cities are all part of the complex of factors known as modernization and are usually positively associated with the level of contraceptive use. Following are some samples of these relationships, based on WFS survey data.

Economic indicators. Contraceptive use generally rises as per capita GNP increases. However, there is considerable variation among countries at similar income levels. For example, among the countries with a GNP per capita under U.S. $200 in 1978 (as estimated by the World Bank), contraceptive use is 35 percent in Sri Lanka, in contrast to 10 percent in Bangladesh and 3 percent in Nepal. In the $200-$399 range, contraceptive use is 10 percent or lower in five countries—Kenya, Lesotho, Pakistan, Senegal and Sudan (North)—and yet is 20 percent in Haiti and 33 percent in Indonesia. Within the next rank, at $400-$1,499, Guyana, Philippines and Thailand have substantially higher levels of contraceptive use than countries with twice the level of GNP per capita. Another example is Costa Rica, with a high level of contraceptive use (71 percent) although its 1978 GNP per capita ($1,540) was scarcely half the $2,900 figure in Venezuela and Trinidad and Tobago, where contraceptive use was

52 and 56 percent, respectively, at the time of their 1977 surveys.

While one can question the use of GNP as a measure of real income (it fails to count noncash income, does not reflect fluctuations in exchange rates, and does not take income distribution into account), it is clear from the WFS data that some countries have been able to achieve higher levels of contraceptive use than others of similar economic status. This finding calls into question the hypothesis that contraceptive use cannot be expected to spread widely before massive socioeconomic development has occurred.

Education. Education, as measured by literacy as well as years of schooling, is also closely correlated with contraceptive use in the 29 developing countries. Low literacy appears to be more of a barrier to contraceptive adoption than low per capita GNP, according to regression analysis of the WFS data. For example, Indonesia, Sri Lanka and Thailand have higher levels of contraceptive use than one might expect from their per capita GNP levels, but the levels are close to what would be predicted by their literacy rates.

The WFS data suggest that widespread contraceptive use is difficult to achieve where literacy levels are low. Except for Haiti, none of the countries with less than 30 percent of literate adults have contraceptive use levels higher than 10 percent. The levels are considerably higher in countries where 50 percent or more of the people are literate.

Educational attainment is similarly a critical ingredient in the mix of factors contributing to high contraceptive use. Contraceptive use increases dramatically as women's years of schooling rise. For instance, Bangladeshi women who have attended school for seven or more years are nearly five times more likely to be contraceptors than women with no education.

This finding is confirmed by data from developed countries. The Economic Commission for Europe analysis of WFS-type data from 16 developed countries found that, regardless of the number of living children they had, the more educated women were more likely to use contraception than those with less schooling.[27]

Urbanization. Regression analysis also shows that, at the country level, contraceptive use increases as urbanization increases. However the correlation is weaker than for GNP per capita and literacy, and several countries diverge from the expected pattern. On the average, contraceptive use increased by one-half of a percent for every one percent of the population living in urban areas.

When the data for individual respondents are tabulated, a more consistent pattern emerges. With a few notable exceptions, such as Indonesia, women who live in urban areas are much more likely to be contraceptive users than rural women. Much of this difference can be attributed to education and other socioeconomic factors, as well as to the wider availability of contraceptives in urban areas.

Childspacing and contraception

It has been generally assumed that most Third World women adopt contraception in order to cease childbearing. WFS data from 27 countries[28] do not support this assumption, but rather they show that a large proportion of contraceptive users practice family planning in order to space births. Giving each country equal weight, more than one-third (35 percent) of contraceptors were using contraceptives for reasons of childspacing. The figure was over 50 percent in four countries—Kenya, Lesotho, Paraguay and Sudan (North). Nearly four in five contraceptors in Latin America and three in ten in the Middle East were using contraception for childspacing. Among the Asian-Pacific countries, childspacing was an important motive for contraceptive use

in Fiji, Indonesia, Malaysia, Philippines, Sri Lanka and Thailand but less significant in the Republic of Korea, Nepal and Pakistan.

These findings indicate that family planning programs in developing countries should focus on potential users of contraception for childspacing as well as women who already have several children and who wish to cease childbearing. Women who use contraception for spacing are more likely to use it successfully when they want to cease childbearing. Childspacing also has an important demographic impact by reducing the fertility of married women in younger age groups in which fertility is highest and by increasing the average interval between births and hence extending the time between generations. Since the average reproductive span is about 30 years, family planning programs need to take into account users' needs throughout their reproductive years.

Contraceptive continuation

Critics of family planning programs have asserted that dropout rates among contraceptive users are high because many women adopt contraception only briefly, perhaps in response to high-pressure tactics from family planning fieldworkers eager to meet stringent quotas. This assertion is also refuted by WFS data which show that a fairly high proportion of women who had ever used contraception were continuing to use it at the time of the survey. Weighting each of the 29 countries equally, 61 percent of the currently married, fecund women who had ever used contraception were current users when interviewed (see Table 14). As one would expect, the proportion of women continuing to use contraception is higher among women who said they wanted no more children than among those who wanted more, especially in the African and Asian countries. However, in Latin America, and in Malaysia, Syria and Turkey, women who wanted more children were almost as likely to have continued contraceptive use as those who wanted no more. This finding reinforces the argument that contraceptive use for child-

Table 14. Contraceptive Continuation by Whether More Children Wanted

(Women using contraception at time of interview as a percent of currently married, fecund women who have ever used contraception)

Region and country	Percent continuing to use contraception		
	Want more children	Want no more children	All ever-users of contraception
Africa			
Kenya	19	36	23
Lesotho	21	34	25
Senegal	—	—	37
Sudan (North)	36	48	40
Regional av.	25	39	31
Asia and Pacific			
Bangladesh	33	57	53
Fiji	50	72	62
Indonesia	67	77	72
Korea, Rep. of	42	60	57
Malaysia	66	70	69
Nepal	30	65	56
Pakistan	36	53	51
Philippines	58	69	65
Sri Lanka	63	78	74
Thailand	64	77	73
Regional av.	51	68	63
Latin America and Caribbean			
Colombia	69	72	70
Costa Rica	77	85	81
Dominican Rep.	54	73	66
Guyana	50	64	58
Haiti	53	57	55
Jamaica	56	64	60
Mexico	67	69	68
Panama	67	80	76
Paraguay	67	69	68
Peru	64	69	68
Trin. & Tob.	64	70	67
Venezuela	68	75	72
Regional av.	68	71	67
Middle East			
Jordan	49	64	58
Syria	61	68	66
Turkey	71	74	73
Regional av.	60	69	66
Total average	57	66	61

Note: Regional and total averages weight each country equally.

spacing purposes may have a significant demographic impact. Overall, the data show that in nearly all countries most women do continue to use contraception once they have tried it.

On the other hand, the data also show that nearly four in ten women who want no more children have stopped using contraception, at least temporarily. Reasons for discontinuation cannot be ascertained, since most country questionnaires did not ask this. However, the Philippines did ask such a question. The major reason given for discontinuation among women who wanted no more children was contraceptive side effects, cited by 32 percent of the women. Accidental pregnancy, cited by 22 percent, was the second most common reason, followed by husband's objections (18 percent), no need for contraception because of husband's absence or infertility (8 percent), and fear of harmful side effects (4 percent).[29]

Assuming that the Philippine experience is reasonably typical and can be generalized to the 29 countries, it implies that the availability of a contraceptive method free from side effects and 100 percent effective could cut discontinuation rates in half, thereby raising the average level of contraceptive use in these countries by 11 percentage points—from 32 percent to 43 percent. This increment would shave about four and a half points off the average birth rate for the 29 countries (i.e. 4.6 births per 1,000 population).[30]

Reproductive preferences

Respondents' preferences regarding family size provide important clues as to their future fertility and their motivation to use contraception. WFS surveys asked four questions on reproductive preferences: (1) the respondent's preferred family size; (2) whether she wanted more children; (3) if so, how many more were wanted; and (4) whether she would prefer the next child to be a boy or a girl. A fifth question, used in 18 of the 29 surveys reported on here, asked respondents who said that they did not want any more children whether they had wanted their last birth.

Family size preferences. All ever-married women were asked how many children they would have in their whole lives if they could "choose exactly" the number to have. Based on the replies of currently married women, the African countries had the highest average preferred family size—7.1—followed by the Middle East group, with an average of 5.1 (see Table 15). The mean for the 12 Latin American countries is 4.3, while that for the ten Asian-Pacific countries is 4.0. In contrast, women in nine European countries who were asked basically the same question in WFS-type surveys of the mid-1970s desired an average ranging from 2.1 children (Hungary) to 2.8 (Spain).[31] The averages for preferred family size in developing countries, with the possible exceptions of the Republic of Korea (3.2 children) and Sri Lanka (3.4), are considerably higher than the level needed to attain modest rates of population growth of under 1 percent annually.

Taken at face value, the WFS data indicate that younger women (aged 15-19) want substantially fewer children than the oldest women (aged 45-49). This finding implies that fertility rates would decline if younger women could implement their family size preferences. Giving equal weight to the 29 countries, women aged 15-19 preferred an average of 3.8 children, compared with an average of 5.7 among women aged 45-49 (see Table 15). Among the youngest women, preferred family size averaged under 3 children in seven countries, 3.0 to 3.9 in 15 countries, and 4 or more in the remaining seven countries.

Proportions wanting no more children. The proportion of women wanting no more children was calculated from answers to the question "Do you want to have any more children?" "Undecided" responses were counted along

Table 15. Preferred Family Size and Percent of Women Wanting No More Children

Region and country	Average preferred family size			Percent of women who want no more children
	All women	Aged 15-19	Aged 45-49	
Africa				
Kenya	7.2	6.5	8.6	17
Lesotho	6.0	5.7	7.2	15
Senegal	8.9	8.8	8.7	—
Sudan (North)	6.4	5.4	6.5	17
Regional av.	7.1	6.6	7.8	16
Asia and Pacific				
Bangladesh	4.1	3.7	4.9	—
Fiji	4.2	2.7	6.1	50
Indonesia	4.3	3.3	5.4	39
Korea, Rep. of	3.2	2.8	3.8	72
Malaysia	4.4	3.9	4.6	45
Nepal	4.0	3.7	4.4	30
Pakistan[a]	4.2	4.1	4.6	43
Philippines	4.4	3.1	5.6	54
Sri Lanka	3.4	2.6	4.8	61
Thailand	3.7	2.9	4.4	61
Regional av.	4.0	3.3	4.9	52
Latin America and Caribbean				
Colombia	4.1	2.7	5.7	62
Costa Rica	4.7	3.5	6.1	52
Dominican Rep.	4.7	3.4	6.1	52
Guyana	4.6	3.4	5.9	55
Haiti	3.6	2.8	4.3	46
Jamaica	4.1	3.3	4.8	51
Mexico	4.5	3.8	5.8	57
Panama	4.3	3.4	5.1	63
Paraguay	5.3	3.7	7.1	32
Peru	3.8	3.1	4.6	61
Trin. & Tob.	3.8	3.2	4.8	47
Venezuela	4.2	3.0	6.0	55
Regional av.	4.3	3.3	5.5	53
Middle East				
Jordan	6.3	4.9	7.5	42
Syria	6.1	5.0	7.1	37
Turkey	3.0	2.8	3.1	57
Regional av.	5.1	4.2	5.9	45
Total average	4.7	3.8	5.7	48

[a]Pakistan respondents were asked how many children they considered ideal for "the average family."

Note: Data are for currently married, fecund women. Regional and total averages weight each country equally.

with "yes" responses as wanting more. Nearly half (48 percent) of the currently married, fecund women aged 15-49 in the 27 countries for which the relevant data are available[32] answered "no" to this question (see last column, Table 15). The percentages of women wanting no more children were highest in Latin America and the Carribbean (53 percent) and Asia (52 percent) and lowest in three sub-Saharan countries—Lesotho (15 percent) and Kenya and Sudan (both 17 percent).

Comparable surveys reveal that the proportion of married women wanting no more children is typically much higher in developed than in developing countries. For example, 73 percent of the currently married, fecund women interviewed in Japan's WFS-type survey of 1974 said they wanted no more children. In Hungary's WFS-type survey of 1977 the proportion was 63 percent, and in Czechoslovakia in 1977, the proportion was 78 percent.[33] Among the findings for 27 developing countries shown in Table 15, these percentages were matched only in Panama (63 percent) and the Republic of Korea (72 percent).

Prospects for Fertility Declines

In order to assess the implications of WFS data for future fertility prospects, estimates were made of hypothetical fertility levels that could be achieved if women were to act consistently with their stated fertility preferences. Two estimates of prospective fertility have been made, based on the prevention of all unwanted births (as measured by the wantedness of the last birth) and on fulfillment of the "unmet need" for family planning—i.e. the adoption of contraception by all women who say they want no more children but who could become pregnant in the immediate future and are not using contraception. Both these estimates are contingent upon two assumptions: (1) that all women who say they want no more children can be persuaded to adopt contraception through a combined program of con-

Table 16. Reduction in Birth Rates If All Unwanted Births Were Prevented

Region and country	Percent of births in year before survey not wanted (1)	Crude birth rate average 0-3 years before survey (2)	Reduction in CBR implied = col. 1 X col. 2 (3)	"Wanted" birth rate implied by data in cols. 1 and 2 (4)	Estimated rates of population growth	
					IDDC estimate for 1976[a] (5)	1976 estimate minus col. 3 (6)
Asia and Pacific						
Bangladesh	37.6	40	15.0	25.0	2.8%	1.3%
Fiji	9.5	31	2.9	28.1	1.6	1.3
Indonesia	13.8	32	4.4	27.6	2.1	1.7
Korea, Rep. of	22.2	29	6.4	22.6	1.9	1.3
Philippines	22.7	34	7.7	26.3	2.4	1.6
Sri Lanka	28.2	28	7.9	20.1	1.6	0.8
Latin America and Caribbean						
Colombia	34.5	34	13.4	20.6	2.2	0.9
Costa Rica	26.6	27	7.2	19.8	2.3	1.6
Dominican Rep.	36.4	40	14.6	25.4	2.7	1.2
Guyana	34.3	29	9.9	19.1	1.3	0.3
Jamaica	44.0	28	12.3	15.7	1.2	0.0
Panama	31.6	28	8.8	19.2	2.7	1.8
Paraguay	11.2	32	3.6	28.4	3.0	2.6
Peru	42.6	36	15.3	20.7	2.8	1.3
Trin. & Tob.	6.5	22	1.4	20.6	0.2	0.1
Venezuela	25.3	34	8.6	25.4	3.3	2.4
Middle East						
Jordan	21.6	45	9.7	35.3	3.6	2.6
Turkey	28.8	32	9.2	22.8	2.3	1.4
Total average	26.8	32.3	8.8	23.5	2.2	1.3

[a]International Demographic Data Center estimates based on subtracting crude death rates and net emigration rates from crude birth rates. Source: U.S. Bureau of the Census, *World Population, 1977: Recent Demographic Estimates for the Countries and Regions of the World* (Washington, D.C.: 1978).

Note: The total average weights each country equally.

traceptive education and improved access to supplies of contraceptive methods; and (2) that all husbands—whose attitudes are unknown since they were not polled—agree with their wives' preferences regarding family size or can be persuaded to support their wives' decisions in this matter.

Fertility effect of preventing unwanted births

Eighteen of the 29 developing countries with completed WFS surveys used a question that allows estimation of the effect on fertility of preventing all unwanted births. Women who stated that they wanted no more children were asked: "Thinking back to the time before you became pregnant with your last child, had you wanted to have any more children?" "Undecided" responses were also counted with "yes" responses to this question.

The proportion of births in the year before the survey that were reported as unwanted ranged from 6 percent in Trinidad and Tobago to 44 percent in Jamaica (see Table 16). According to the estimates presented in Table 16, crude birth rates (annual births per 1,000 population) would fall very sharply in many developing countries if all unwanted births could be prevented. (Estimates of crude birth rate declines are

calculated by multiplying the percentage of the previous year's births that were unwanted by the average crude birth in the three years before the survey listed in column 2.) Weighting the 18 countries equally, the average country would reduce its crude birth rate by 8.8 points, from 32.3 to 23.5 births per 1,000 population, if all unwanted births were prevented. The estimated reductions are especially large for Bangladesh, Dominican Republic and Peru; birth rates in these countries would decline by 15 points. Colombia, Guyana, Jamaica and Jordan would also realize substantial birth rate declines of ten points or more. On the other hand, the estimated reductions are not particularly significant in Fiji, Indonesia, Paraguay, and Trinidad and Tobago.

To approximate the effect of these potential birth rate reductions on the annual rate of population growth, the birth rate reductions were applied to estimates of these countries' 1976 growth rates made by the U.S. Census Bureau's International Demographic Data Center. The results suggest that population growth rates could be halved in Bangladesh, Colombia, Dominican Republic, Guyana, Jamaica, Peru and Sri Lanka if all unwanted births were prevented (last column, Table 16). Such a reduction would drop the growth rate of several countries—notably Colombia, Guyana, Jamaica and Sri Lanka—to the developed world level of less than 1 percent per year. Indeed, Jamaica's population would stop growing altogether.

For the 18 countries as a whole (weighting each equally), the 1976 population growth rate would have been 1.3 percent rather than 2.2 percent if all unwanted births had been prevented. The magnitude of this difference can be illustrated by the use of doubling times: a population growing at 1.3 percent annually will double within 53 years, compared with a doubling time of just 32 years for a population growing at 2.2 percent annually. Thus the effects of preventing all unwanted births among women who want no more children are highly significant in demographic terms.

Fertility effect of filling unmet need for family planning

The "unmet need" for family planning has been defined in numerous ways. The broadest definition includes all fecund women unprotected by effective modern contraception who are at risk of unwanted childbearing, which includes both "at risk" noncontraceptors who want to space the next birth and also those who want to stop childbearing entirely. A considerably more restrictive definition is used here, estimating only the unmet need for contraception for purposes of stopping childbearing among women who are not using any method of contraception and who are at immediate risk of pregnancy.

This more stringent estimate of the unmet need for family planning narrows the definition to women at *immediate* risk of pregnancy by eliminating three categories of women from the group of currently married noncontraceptors who considered themselves fecund but said they did not want any more children. The categories are: (1) women imputed to be temporarily infecund due to having had a birth in the preceding 12 months; (2) women who currently (at the time of the survey) have an unwanted pregnancy; and (3) women who were considered unlikely to have another birth because they had had no births in the five years before the survey despite not using contraception and being continuously married during this period.[34]

The resulting proportion of currently married women who want no more children and are at immediate, unprotected risk of becoming pregnant varies from 2 percent in Lesotho and Senegal to 14 percent in Guyana and the Republic of Korea. (See Table 17, column 1. The 24.6 percent shown for Bangladesh is misleading because the question on

Table 17. Estimates of Declines in Birth Rates Through Meeting Unmet Need for Family Planning Versus Preventing All Unwanted Births

Region and country	Unmet need	Number of points birth rate would decline through	
	Percent of women at immediate risk of unwanted pregnancy[a] (1)	Supplying women at immediate risk of unwanted pregnancy with efficient contraception = col. 1 X 0.414 (2)	Preventing all unwanted births (from col. 3, Table 16) (3)
Africa			
Kenya	2.9	1.2	—
Lesotho	1.8	0.7	—
Senegal[b]	1.9	0.8	—
Sudan (North)	2.5	1.0	—
Asia and Pacific			
Bangladesh[c]	24.6	10.2	15.0
Fiji	9.7	4.0	2.9
Indonesia	6.1	2.5	4.4
Korea, Rep. of	14.0	5.8	6.4
Malaysia	8.9	3.7	—
Nepal	10.2	4.2	—
Pakistan	12.0	5.0	—
Philippines	8.1	3.3	7.7
Sri Lanka	10.5	4.3	7.9
Thailand	8.2	3.4	—
Latin America and Caribbean			
Colombia	11.4	4.7	13.4
Costa Rica	3.7	1.5	7.2
Dominican Rep.	7.9	3.3	14.6
Guyana	13.7	5.7	9.9
Haiti	7.9	3.3	—
Jamaica	10.2	4.2	12.3
Mexico	10.6	4.4	—
Panama	6.2	2.6	8.8
Paraguay	5.8	2.4	3.8
Peru	12.7	5.3	15.3
Trin. & Tob.	6.4	2.6	1.4
Venezuela	7.9	3.3	8.6
Middle East			
Jordan	5.9	2.4	9.7
Syria	4.5	1.9	—
Turkey	8.5	3.5	9.2

[a]For definition of this category of women, see text, page 45.

[b]Senegal estimate is based on assuming that women want no more children if their preferred family size is less than or equal to their actual number of living children.

[c]Bangladesh data on women who want no more children are based on whether women wanted another child "soon."

wanting more children was phrased "Do you want another child soon?") Assuming that all such women were to adopt an efficient method of contraception, birth rates in the 28 developing countries analyzed (excluding Bangladesh) would decline by between 0.7 and 5.8 points (i.e. births per 1,000 population), as seen in column 2 of Table 17. (The percent of women at immediate risk of unwanted pregnancy, shown in column 1, is multiplied by 0.414—the amount of birth rate decline associated with a 1 percent increase in the proportion of women using efficient contraception.*) Column 3 of Table 17 shows the birth rate declines that would result from preventing all unwanted births (repeated from column 3 of Table 16).

For 15 of the 17 developing countries with comparable data, the projected birth rate declines are higher for preventing all unwanted births than they are for filling the unmet need for family planning as measured here. In Colombia, for example, the birth rate would decline by 13 points if all unwanted births could be prevented, compared with 5 points if the unmet need for family planning were filled. The reason for this difference is that preventing all unwanted births assumes that all fecund women who want no more children are provided with 100 percent effective contraception (or less than perfect contraception combined with induced abortion in the event of contraceptive failure), whereas the particular unmet need definition used here assumes that only "at risk" noncontraceptors who want no more children are supplied with contraceptives, that the contraceptives are not 100 percent effective, and that the level of contraceptive failure existing at the time of the survey continues into the future.

In two of the 17 countries with comparable data—Fiji and Trinidad and Tobago—the projected birth rate declines are higher for filling the unmet need for family planning than they are for preventing all unwanted births. The two estimates are close for three other countries—Indonesia, Republic of Korea and Paraguay. One explanation for this unexpected finding may be that proportions of unwanted births are underestimated in these five countries because women were reluctant to admit to the interviewer that their last birth was unwanted.[35]

It is important to emphasize that these estimates of potential fertility declines are based only on providing efficient contraception to women who stated that they wanted no more children and were at immediate risk of pregnancy. Extending contraception to all fecund women who want to stop childbearing would undoubtedly reduce fertility further, as would extending contraception to all "at risk" women who wish to space their births.

However, even if most unwanted or mistimed births could be prevented, preferred family size is still so high in many of the developing countries that further changes in family size desires and norms will be needed in order to bring fertility levels down low enough to achieve moderate population growth rates.

Meeting the unmet need

The hypothetical birth rate declines presented in the last section assume that noncontraceptors who want no more children can be persuaded to use contraception. How easy will this be? The answers possible so far are conflicting, depending upon whether one looks at WFS data on women's willingness to use contraception in the future or at increases in contraceptive "prevalence" or use measured by surveys or studies conducted in ten countries two to five years after the original WFS survey.

Judging from WFS data available to date, it might seem very difficult to persuade all fecund women who want no more children to adopt contraception.

*The figure 0.414 is the reciprocal of the 2.4 percent estimate discussed on page 39.

Table 18. Increases in Contraceptive Prevalence Compared to Unmet Need for Family Planning

Region and country	Contraceptive prevalence[a] in First survey		Contraceptive prevalence[a] in Second survey		Increase in prevalence	Unmet need (from col. 1, Table 17)
Asia						
Bangladesh	7%	(1976 WFS)[b]	13%	(1979 CPS)[b]	6%	24.6%
Indonesia	21	(1976 WFS)	41	(1980)	20	6.1
Korea, Rep. of	37	(1974 WFS)	54	(1979 CPS)	17	14.0
Thailand	37	(1975 WFS)	49	(1979)	12	8.2
Latin America and Caribbean						
Colombia	43	(1976 WFS)	48	(1978 CPS)	5	11.4
Costa Rica	66	(1976 WFS)	67	(1978 CPS)	1	3.7
Dominican Rep.	32	(1975 WFS)	42	(1980)	10	7.9
Jamaica	40	(1975/6 WFS)	55	(1979 CPS)	15	10.2
Mexico	32	(1976/7 WFS)	41	(1978 CPS)	9	10.6
Panama	53	(1975/6 WFS)	63	(1979/80 CPS)	10	6.2

Sources: Dominican Republic: John N. Hobcraft and German Rodriguez, *The Analysis of Repeat Fertility Surveys: Examples from Dominican Republic*, WFS Scientific Reports No. 29, forthcoming; Indonesia: Ronald Freedman, Siew-Ean Khoo, and Bondan Supraptilah, "Use of Modern Contraceptives in Indonesia," *International Family Planning Perspectives*, Vol. 7, No. 1 (March 1981) p. 5; Thailand: John Knodel et al, "Thailand's Continuing Reproductive Revolution," *International Family Planning Perspectives*, Vol. 6, No. 3 (September 1980) p. 89; all other countries: Population Information Program, Johns Hopkins University, "Contraceptive Prevalence Surveys: A New Source of Family Planning Data," *Population Reports*, Series M, No. 5 (May-June 1981).

[a]Contraceptive prevalence refers to the percentage of currently married women using any method of contraception. Age groups are 15-44 for Bangladesh, Colombia, Dominican Republic, Jamaica, Republic of Korea, Mexico and Thailand; 20-44 for Costa Rica and Panama; and 15-49 for Indonesia. The WFS figures shown in column one are lower than the contraceptive use figures for these countries listed in Table 11 (page 32) because they cover a narrower age range, include infecund women, and are not age-standardized.

[b]WFS refers to World Fertility Surveys; CPS are Contraceptive Prevalence Surveys, which are being conducted in developing countries with the assistance of Westinghouse Health Systems and the U.S. Centers for Disease Control.

Among the nonpregant, fecund women who wanted no more children and were not using contraception, an average of 46 percent across the 29 developing countries said they were either unwilling to use contraception in the future or undecided about whether they would. The other 54 percent of this group was comprised of 25 percent who said they were willing to try contraception in the future and 29 percent who were past users of contraception, who were not asked if they planned to use contraception again, but whose reasons for discontinuation possibly deserve further analysis.

However, the prospects for meeting the unmet need for contraception appear much more hopeful in light of the comparisons that are possible with the data shown in Table 18. The table shows the increases in contraceptive prevalence recorded subsequent to the WFS surveys, together with the estimates of unmet need for these ten countries from Table 17.

As can be seen, for example, Thailand's 1975 unmet need (as defined in this *Bulletin*) was 8.2 percent; yet contraceptive use rose 12 percentage points in the four years after 1975, from 37 percent of currently married women aged 15-44 in the 1975 WFS survey to 49 percent in a 1979 national fertility survey. In seven of the ten countries, the actual increase in contraceptive prevalence came close to or exceeded the amount of unmet need within short time periods: Dominican Republic, Indonesia, Jamaica, Republic of Korea, Mexico, Panama and Thailand. The increase in contraceptive use was substantially less than the amount of unmet need only in

Bangladesh, Colombia and Costa Rica. For Bangladesh, as noted, the estimate of unmet need is unavoidably high compared to the other estimates; Costa Rica already had a high level of contraceptive use at the time of its 1976 WFS survey; and Colombia's contraceptive prevalence did increase 5 percentage points in two years, or half the amount of the unmet need.

It is true that the increases in contraceptive use may have been due mainly to women using contraception for childspacing rather than women adopting contraception to stop childbearing. But the comparisons do suggest that conclusions drawn from WFS data on willingness to use contraception may substantially underestimate the potential for rapid increases in contraceptive use in the developing world.

Summary and Conclusion

The WFS was a highly ambitious undertaking that succeeded beyond the expectation of its founders. Many other fertility surveys, both prior to the WFS and contemporary with it, have been terminated without publishing results—victims of bureaucratic inertia, difficult field conditions, erratic coders and computers, political sensitivities, and numerous other problems. The WFS is extraordinary, not only in its scope and detail, but also in its ability to overcome seemingly insurmountable obstacles to produce high-quality published reports. As one indication of WFS' ability to develop solutions to complex statistical problems, its technical manuals and reports are widely used in graduate-level statistics courses.

The results of WFS surveys have already contributed a great deal to knowledge of national and international population trends, and will be looked to for basic information on fertility for some time to come. Following is a summary of the important WFS findings reported in this *Bulletin* that are likely to find their way into the annals of demographic history.

For the 29 developing countries for which WFS data were available in early 1982, no fertility decline was found in Africa, while substantial fertility declines (of at least one child per woman) were noted in Asia and the Pacific, Latin America and the Caribbean, and in the Middle East. Some of these declines were not expected (e.g., a decline of nearly one child per woman in Pakistan) or were unrecorded prior to the WFS surveys (e.g., in the Dominican Republic, Mexico and Peru). However, by the late 1970s none of the 29 developing countries analyzed had reached a birth rate of under 20 births per 1,000—the level of all developed countries—and ten countries still had birth rates above 40.

Nearly half (48 percent) of the women surveyed in 27 developing countries said they did not want any more children. Analysis of data from 18 countries shows that preventing all unwanted births would have reduced their average 1976 population growth rate from 2.2 percent (a population doubling time of 32 years) to 1.3 percent (a doubling time of 53 years).

Still, even if most unwanted or mistimed births could be prevented, preferred family size is so high in developing countries—ranging from an average of 4.0 children per woman in Asia to 7.1 in Africa, compared to just over 2 in developed countries—that further changes in family size desires and norms will be needed to bring fertility levels down low enough to achieve the moderate population growth rate of under 1 percent annually typical of developed countries. Some change *is* evident among the youngest married women aged 15-19 who said they preferred 3.8 children on average—nearly two children less than the average of 5.7 children preferred by the oldest women aged 45-49.

Only about one-third of the currently married, fecund women interviewed in the 29 developing countries were using contraception, compared with an average of 72 percent of those in 16 developed countries that have conducted recent WFS-type surveys.

Contraceptive use rises dramatically with education. For example, Bangladeshi women with seven or more years of schooling are nearly five times more likely to use contraception than women with no education. Higher levels of literacy are more closely related to increasing contraceptive use than increases in GNP per capita.

Contraceptive use is higher in communities where family planning services are more available, both as measured by women's perceptions of availability and objective assessments of availability from interviews with local officials conducted in conjunction with WFS surveys.

Close to two-thirds (61 percent) of the married, fecund women who had ever used contraception were continuing to use it at the time of interview.

Nearly half (46 percent) of the nonpregnant, fecund women who wanted no more children and were not using contraception said they were unwilling to use contraception in the future or were undecided about whether they would. However, subsequent surveys showed substantial increases in contraceptive use among currently married women in seven of ten countries only two or five years after their WFS surveys.

The median age at marriage is rising in Asia, though not in Africa or Latin America and the Caribbean. However, age at marriage is not as closely linked to fertility levels as is generally believed: there appears to be a "catch-up" effect, whereby women who marry later (e.g., at age 21) do not necessarily have fewer children than women marrying in their teens.

WFS surveys reveal that existing data, where available, have underestimated the true level of infant mortality in many developing countries. Among individual women, fertility rises as the number of child deaths increases, but only part of this association is due to the desire to replace children who have died.

Breastfeeding is all but universal in Africa, Asia and the Middle East and is continued for one to two years, on average, after a child's birth in Africa and Asia. In Latin America, about 80 percent of women breastfeed, but the duration is generally under one year. WFS data from eight countries show that one month of breastfeeding adds from 0.3 to 0.7 months to the length of the interval between births, suggesting that in countries where women breastfeed for long intervals, breastfeeding acts as an important restraint on fertility. However, WFS data indicate that breastfeeding is likely to decline as developing countries urbanize and women become better educated and increasingly employed away from home. These changes could thus indirectly cause an increase in birth rates, although they also tend to increase contraceptive use in the long term.

The value of the WFS is that these trends and relationships are now carefully documented and that comparisons among a large number of countries can be made. WFS has taken some of the guesswork out of policymaking and program administration and evaluation. □

World Fertility Survey logo.

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